

Bonnethhead and Blacknose Shark Assessment State-space, Age-structured Production Model

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OUTLINE

1. Data Inputs
 - a. Fishery
 - b. Biology
2. Model Description
3. Base Model and Results
4. Sensitivity Cases
5. Summary of all Results

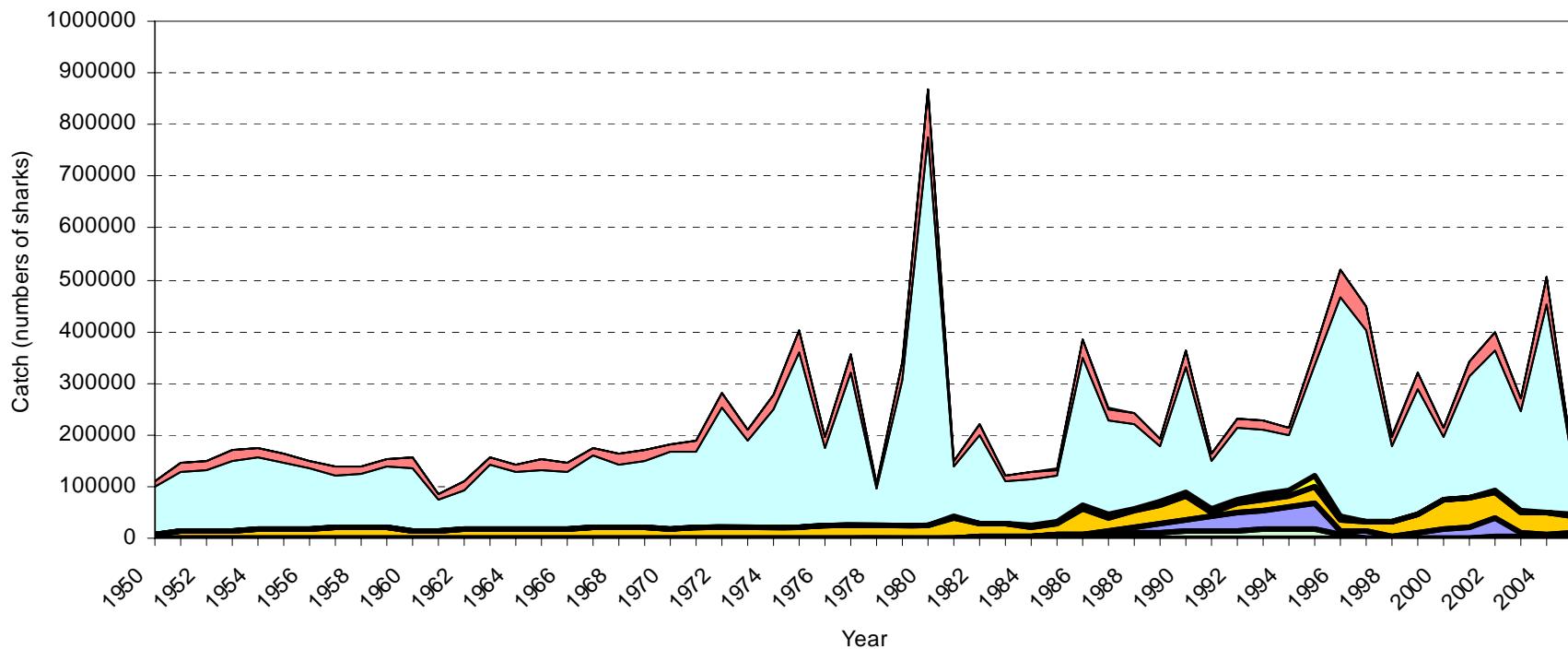
BH a. Fishery Inputs

- Catch Series:
 - Commercial
 - Longline
 - Gillnet
 - Handline
 - BLL-discards
 - Recreational
 - Shrimp Bycatch

Catches

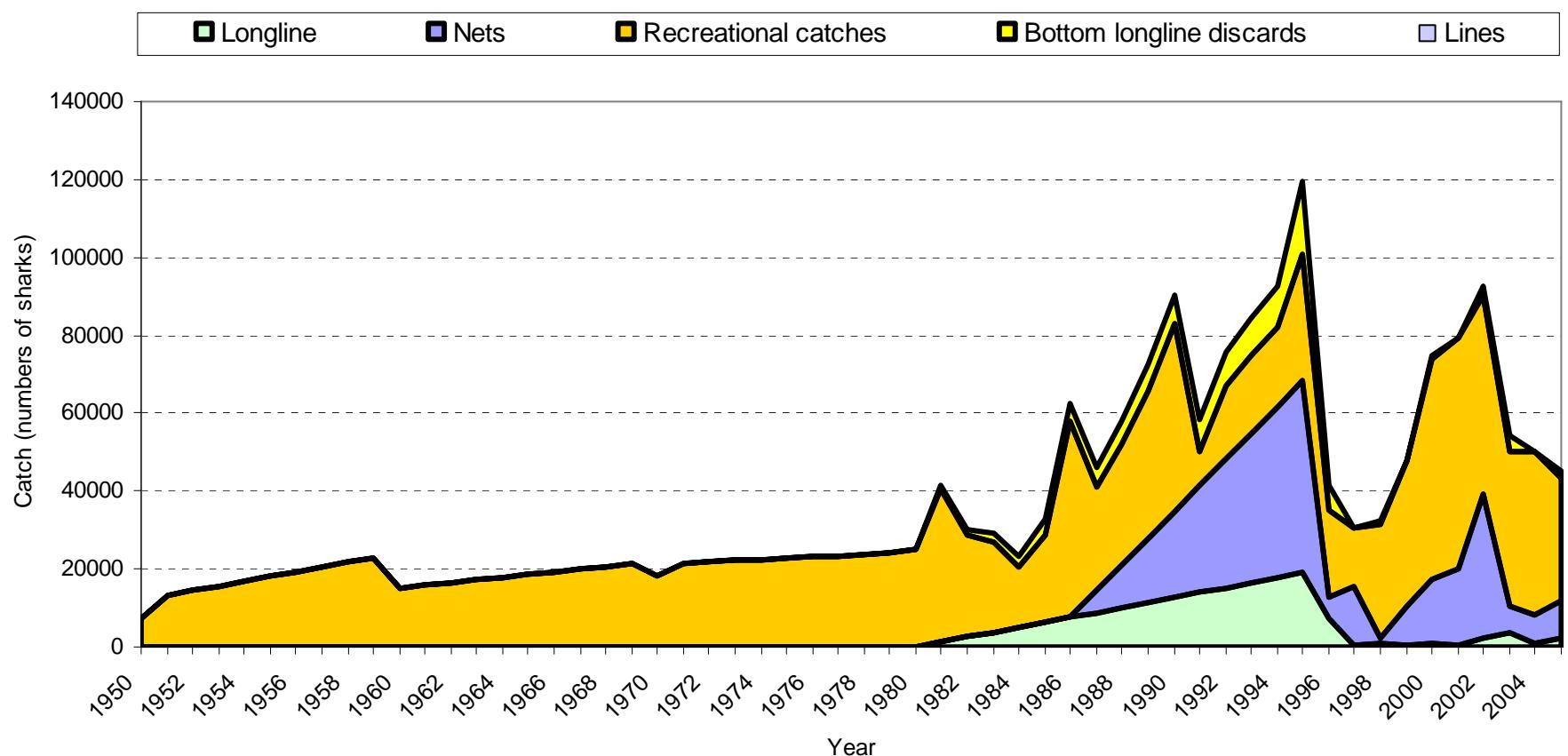
Bonnetahead shark (catches in numbers)

■ Longline ■ Nets ■ Recreational catches ■ Bottom longline discards ■ Shrimp bycatch (GOM) ■ Shrimp bycatch (SA) ■ Lines



Catches

Bonnethead shark (catches in numbers)

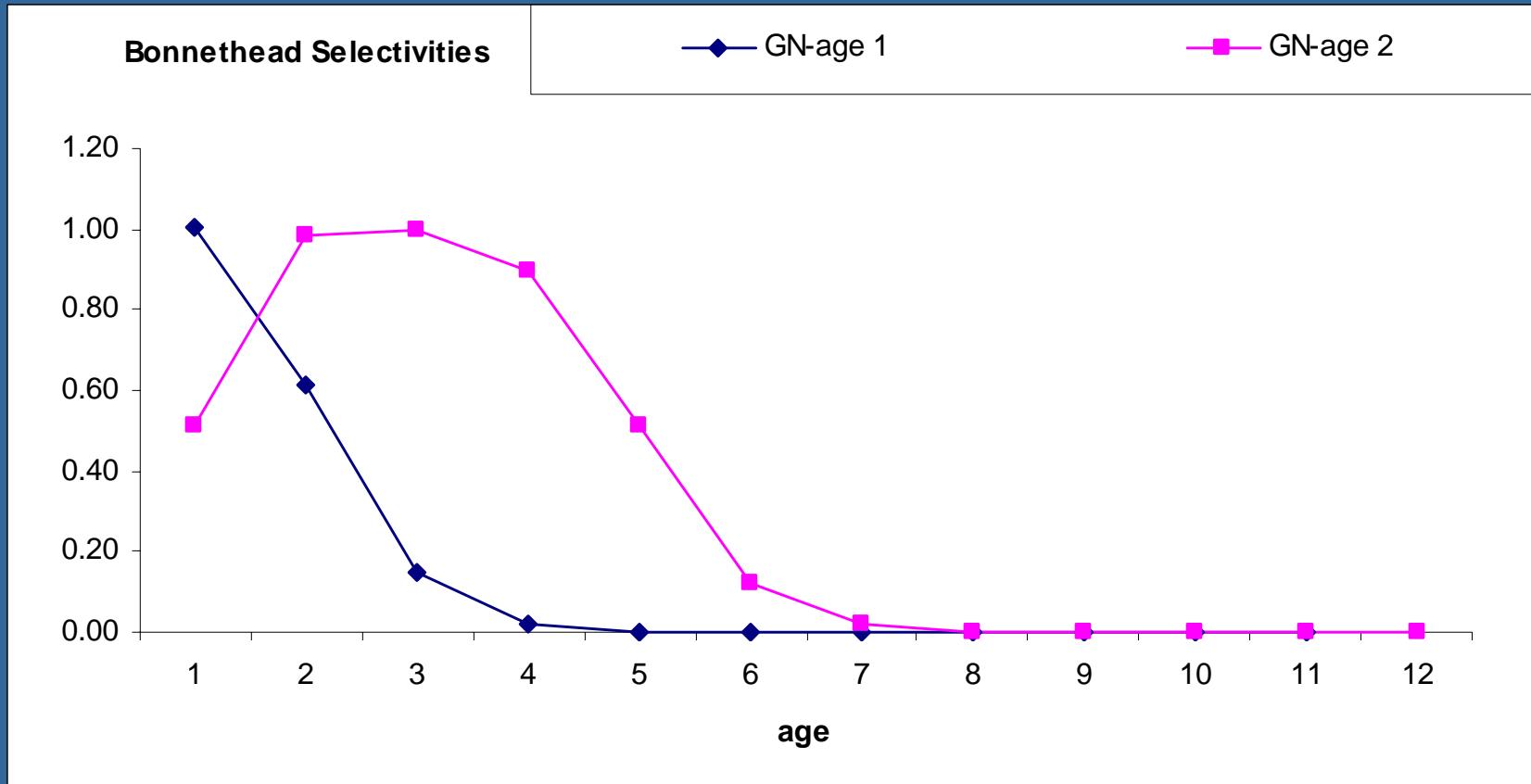


BH a. Indices

- Indices of Abundance:

- PC-Gillnet adult
- PC-Gillnet juvenile
- GNOP
- ENP
- SEAMAP-SA
- Texas
- SC Coastspan GN
- SEAMAP-GOM EF
- SEAMap-GOM ES
- MML-GN adult
- MML-GN juvenile

Selectivity - Catch



1b. Biological Inputs – DW values

Parameter	Bonnethead	Blacknose	Sharpnose
L_∞	113.9 (cm TL)	80.2 (cm FL)	80.2 (cm FL)
K	0.22	0.3	0.61
t0	-1.25	-1.71	-0.84
a	9.52E-11	8.0E-06	5.55519E-6
b	3.59	3.0494	3.07395
Pup Survival	0.66	0.72	0.70
Virgin Recruitment (R0)	[1.0E+4, 1.0E+10]	[1.0E+4, 1.0E+10]	[1.0E+3, 1.0E+10]

2. Model Description

- Historical period 1950-1971
- Estimated catch series begin in 1972 (Shrimp bycatch) and 1981 (Recreational); earliest index (SEAMAP GOM EF) begins in 1972
- Catches from 1950-1972 were estimated

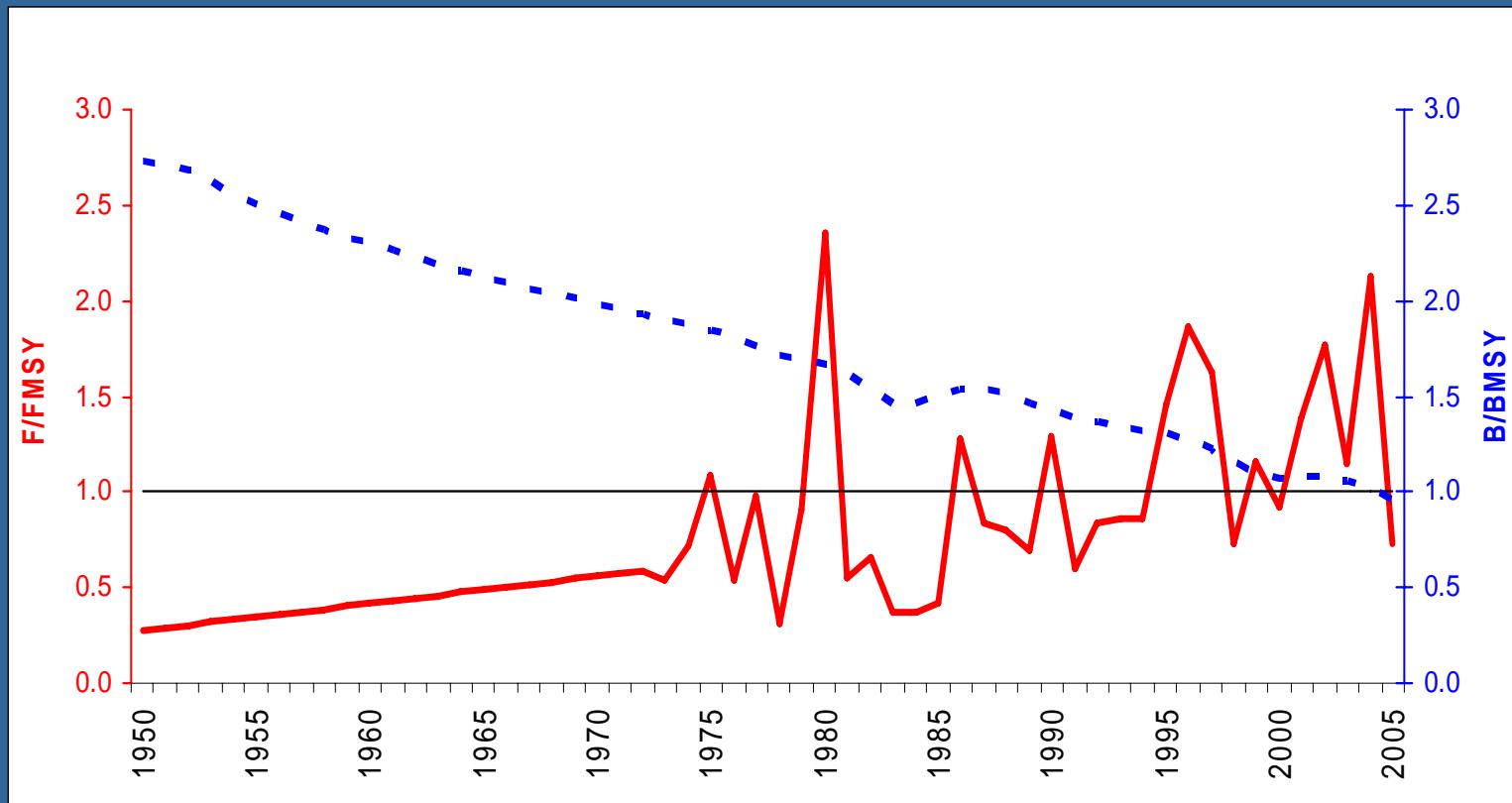
3. Base Model and Results

Parameter	BASE
$\text{SSF}_{2005}/\text{SSF}_{\text{MSY}}$	0.96 (0.51)
F_{2005}/F_{MSY}	0.73 (0.83)
N_{2005}/N_{MSY}	0.73
N_{MSY}	2.30E+06
N_0	1.47E+06
MSY	687,100
SPR_{MSY}	0.57 (0.21)
F_{MSY}	0.31

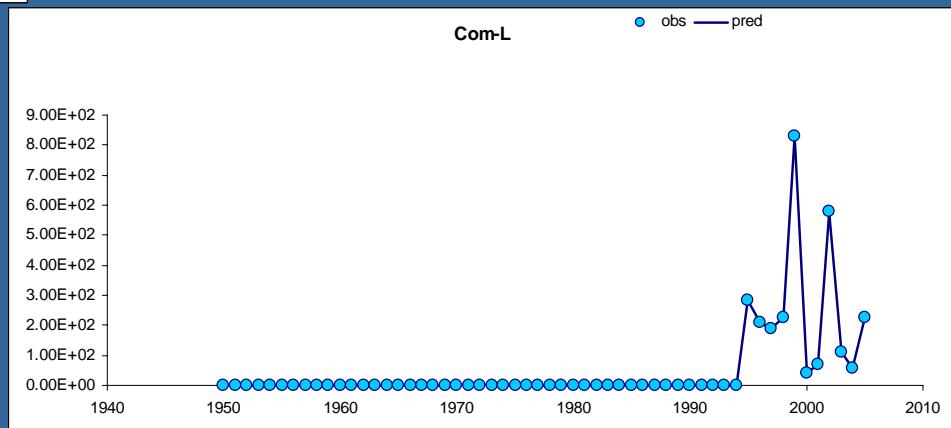
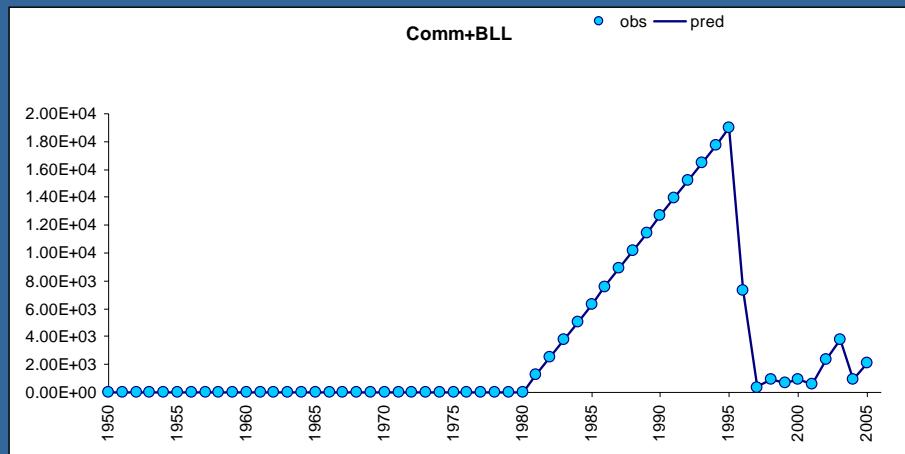
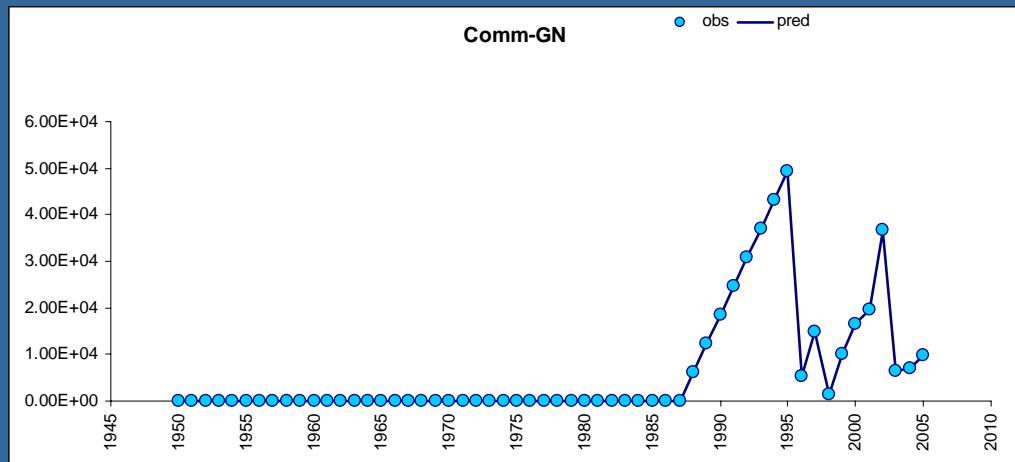
Base model results con't.

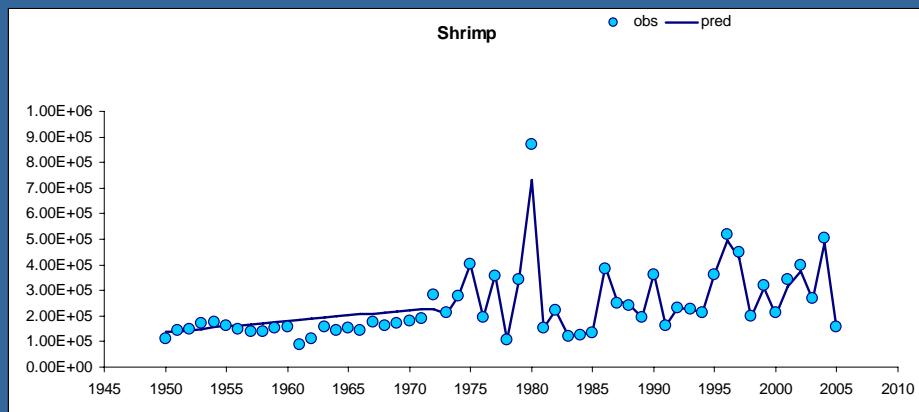
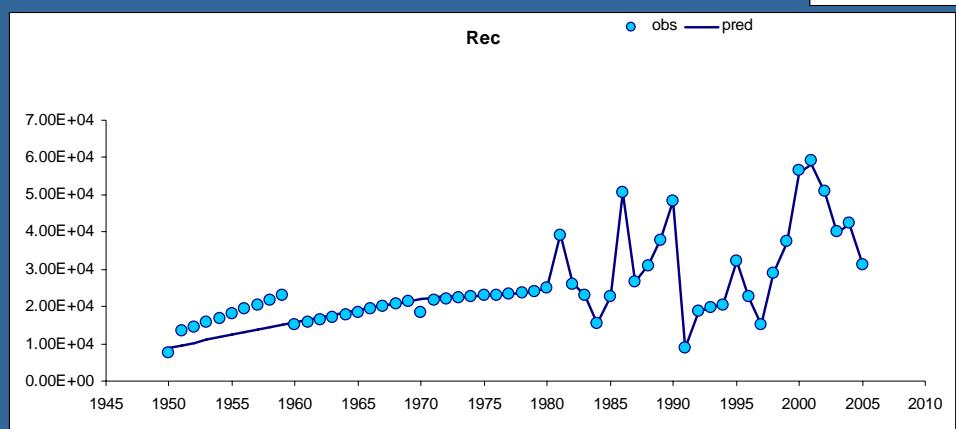
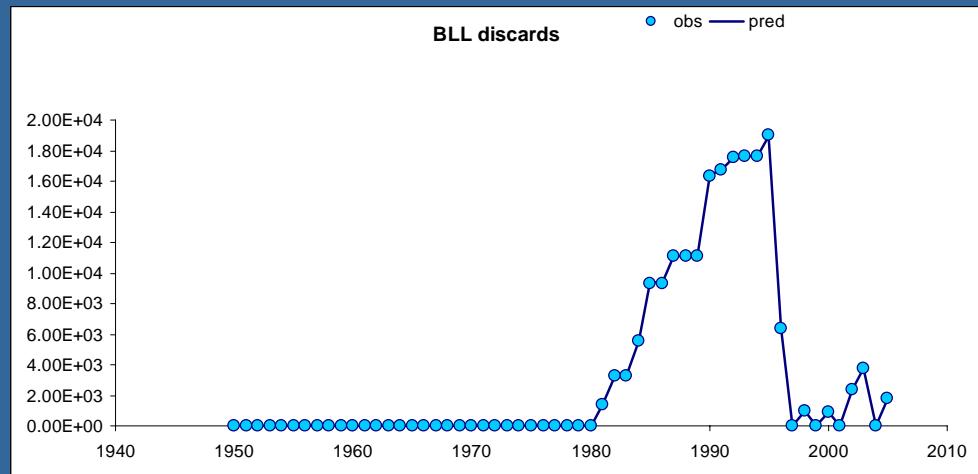
SSF_{MSY}	2.41E+06
F_{2005}	0.23 (0.83)
SSF_{2005}	2.31E+06 (0.69)
N_{2005}	1.69E+06
$\text{SSF}_{2005}/\text{SSF}_0$	0.35 (0.50)
B_{2005}/B_0	0.35 (0.49)
R_0	1.47E+06 (0.24)
Pup-survival	0.71 (0.24)
alpha	3.12
steepness	0.438

Overfished with no overfishing

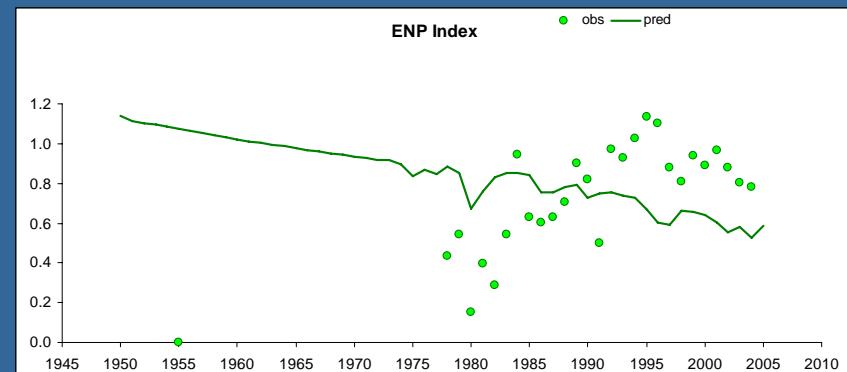
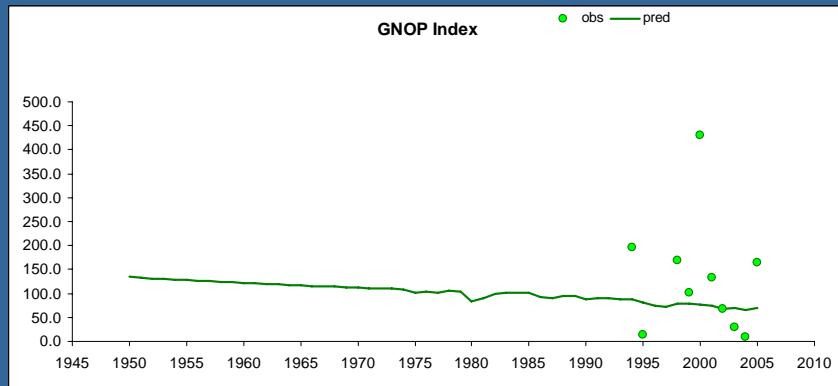
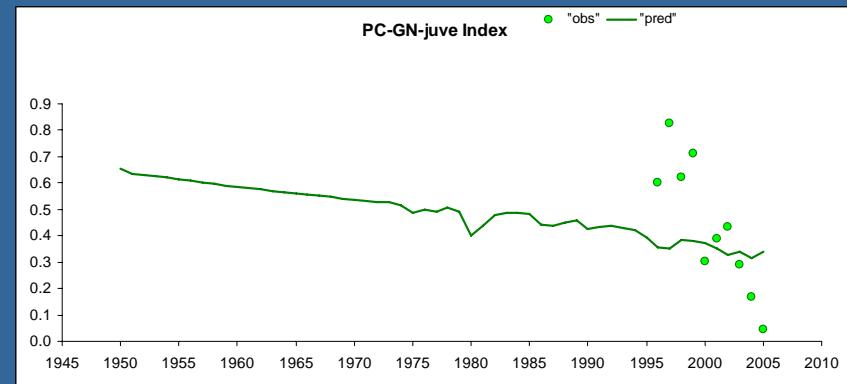
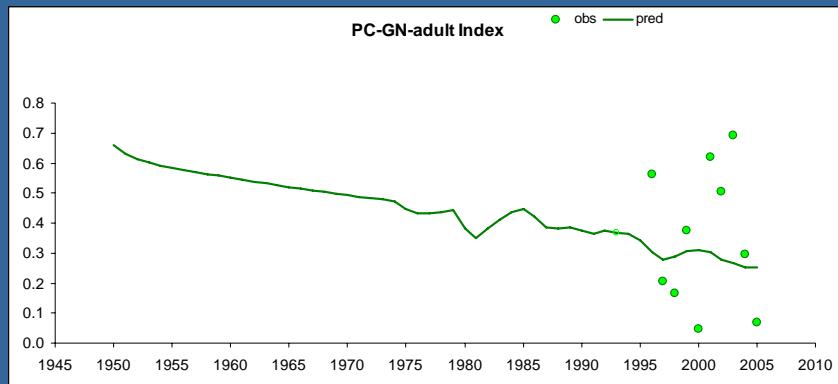


CATCHES



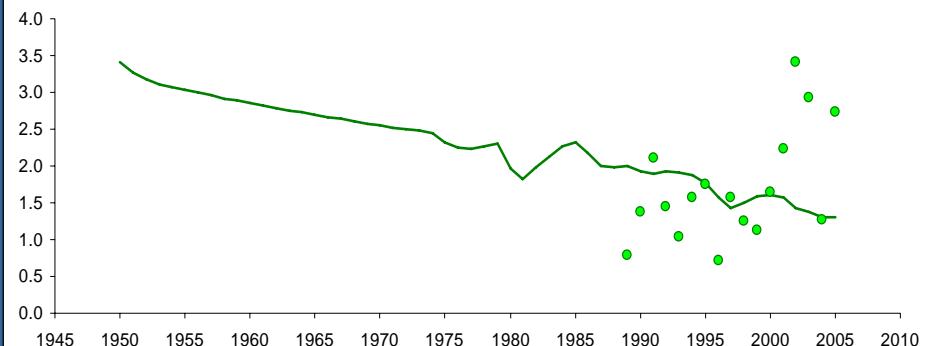


INDICES



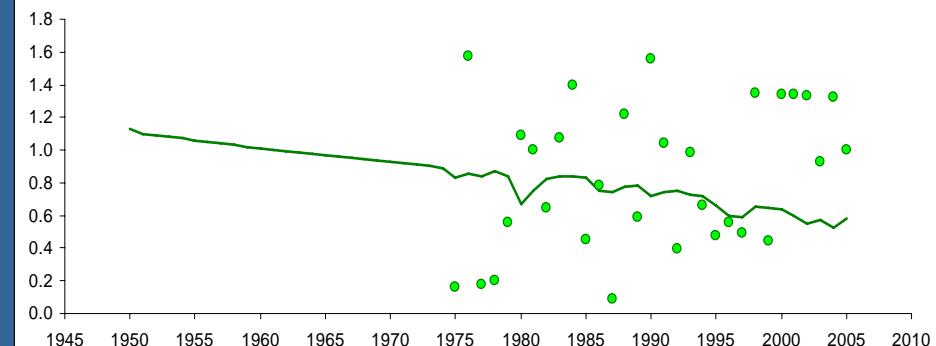
SEAMAP SA Index

obs pred



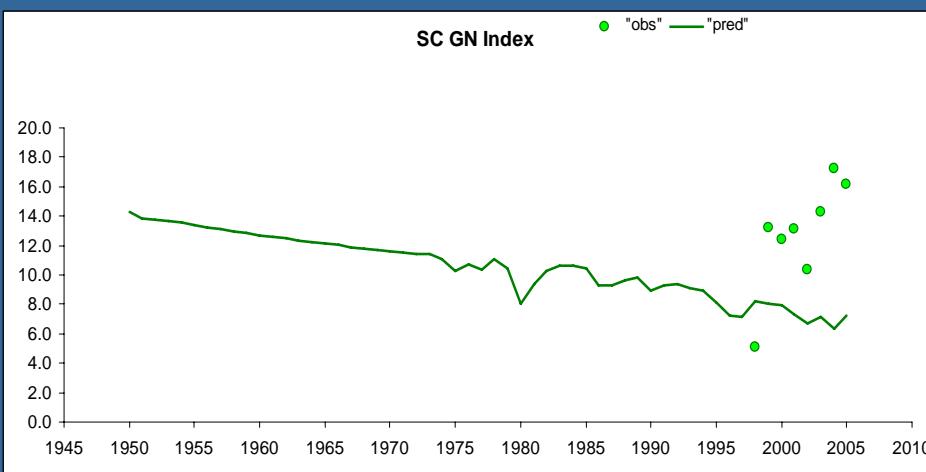
Texas Index

obs pred



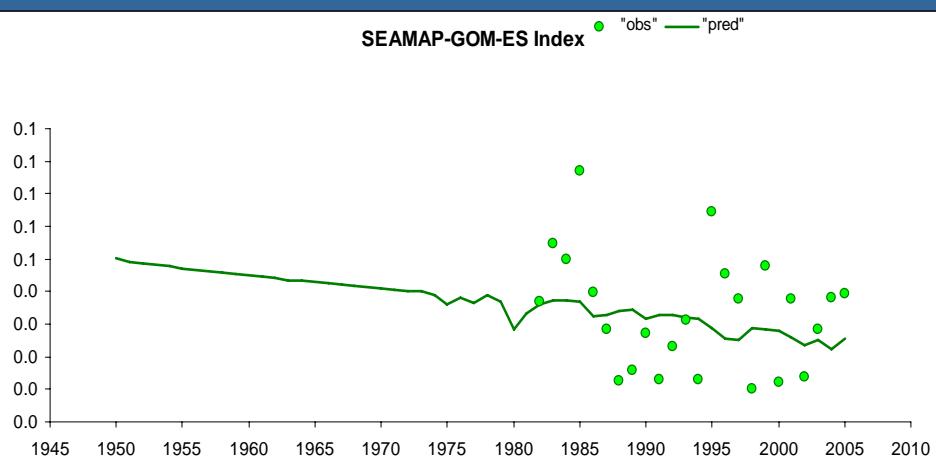
SC GN Index

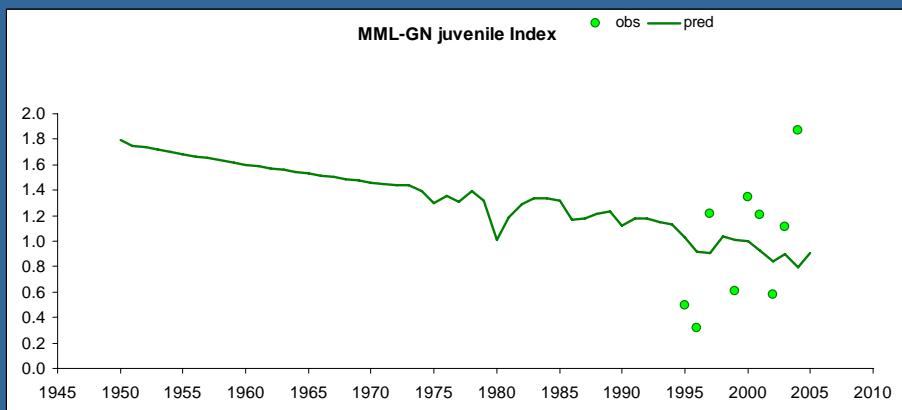
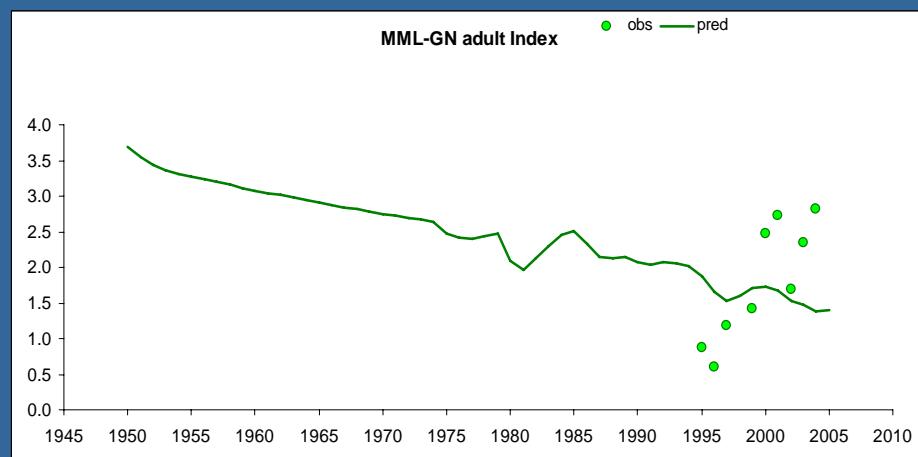
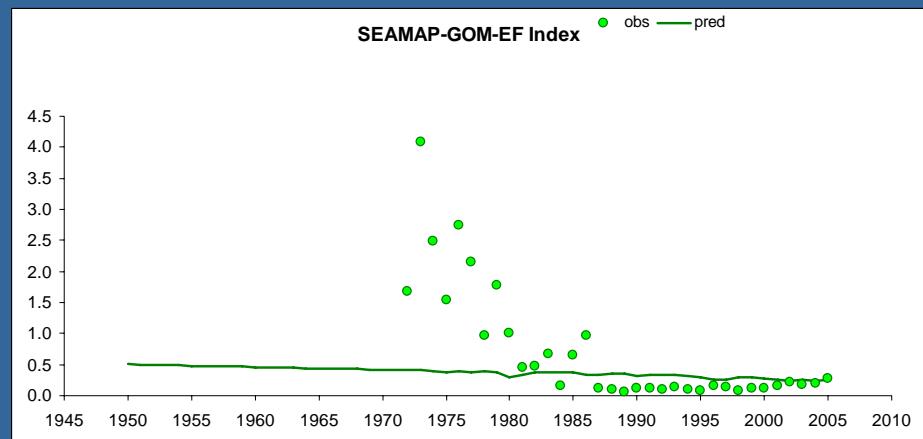
"obs" "pred"

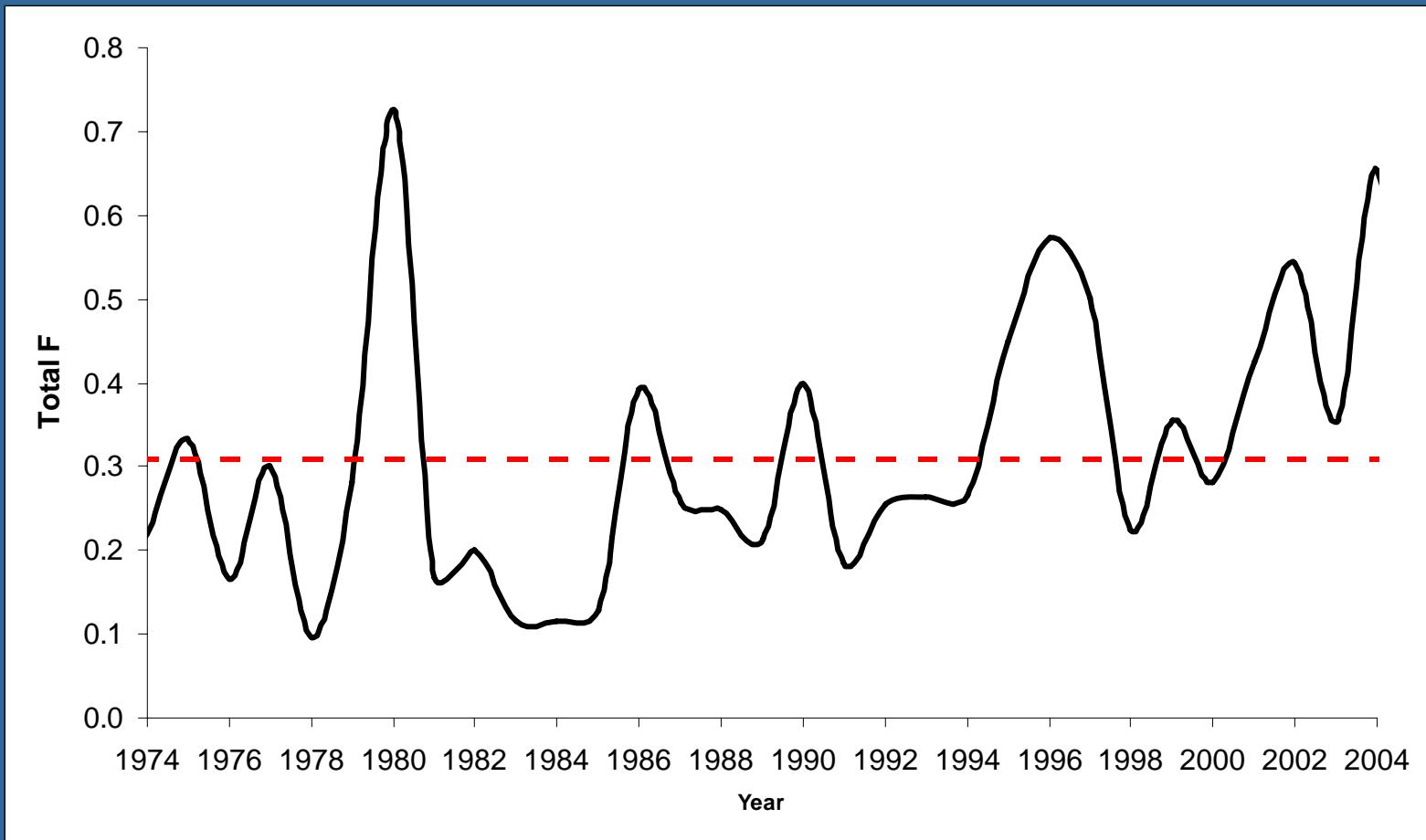


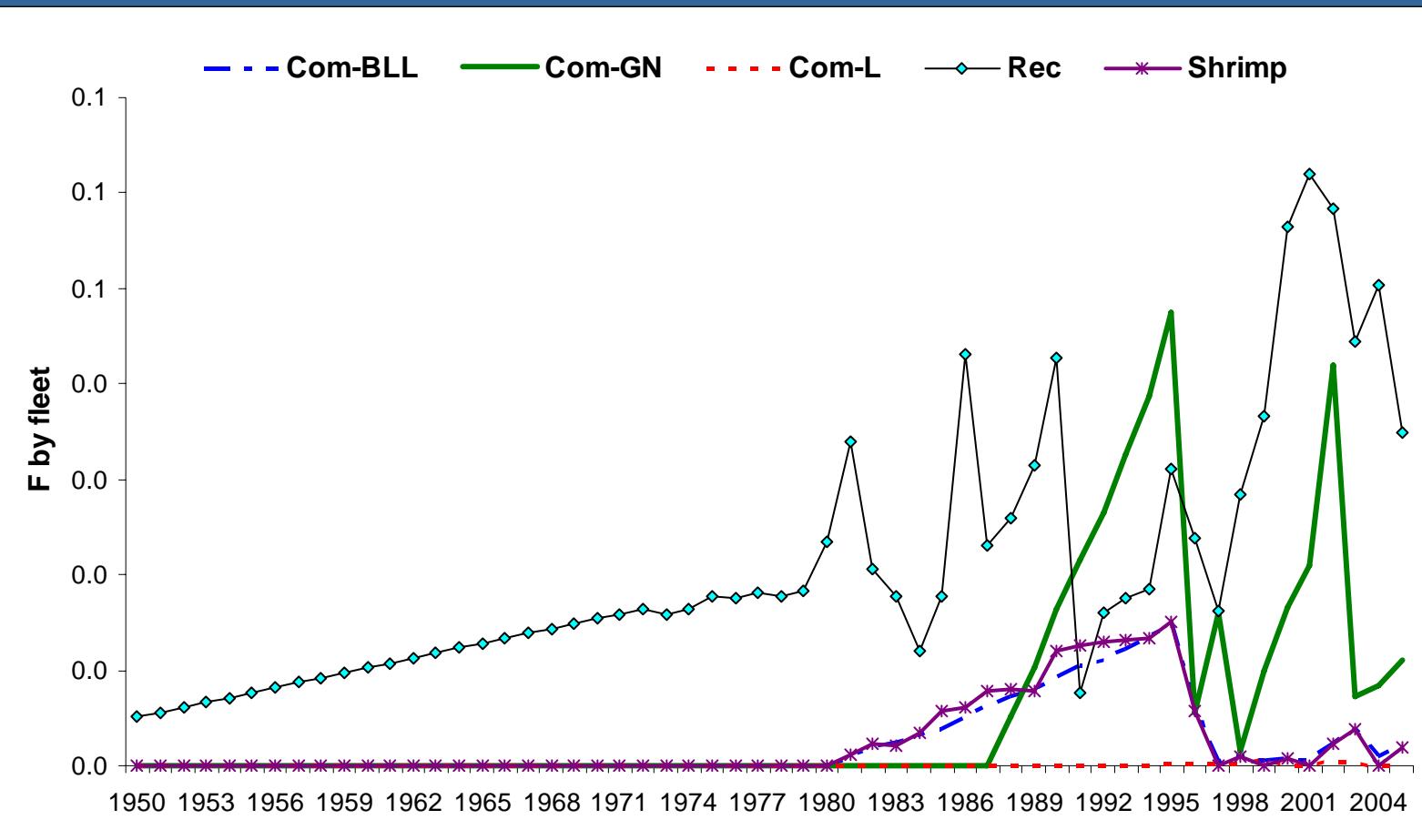
SEAMAP-GOM-ES Index

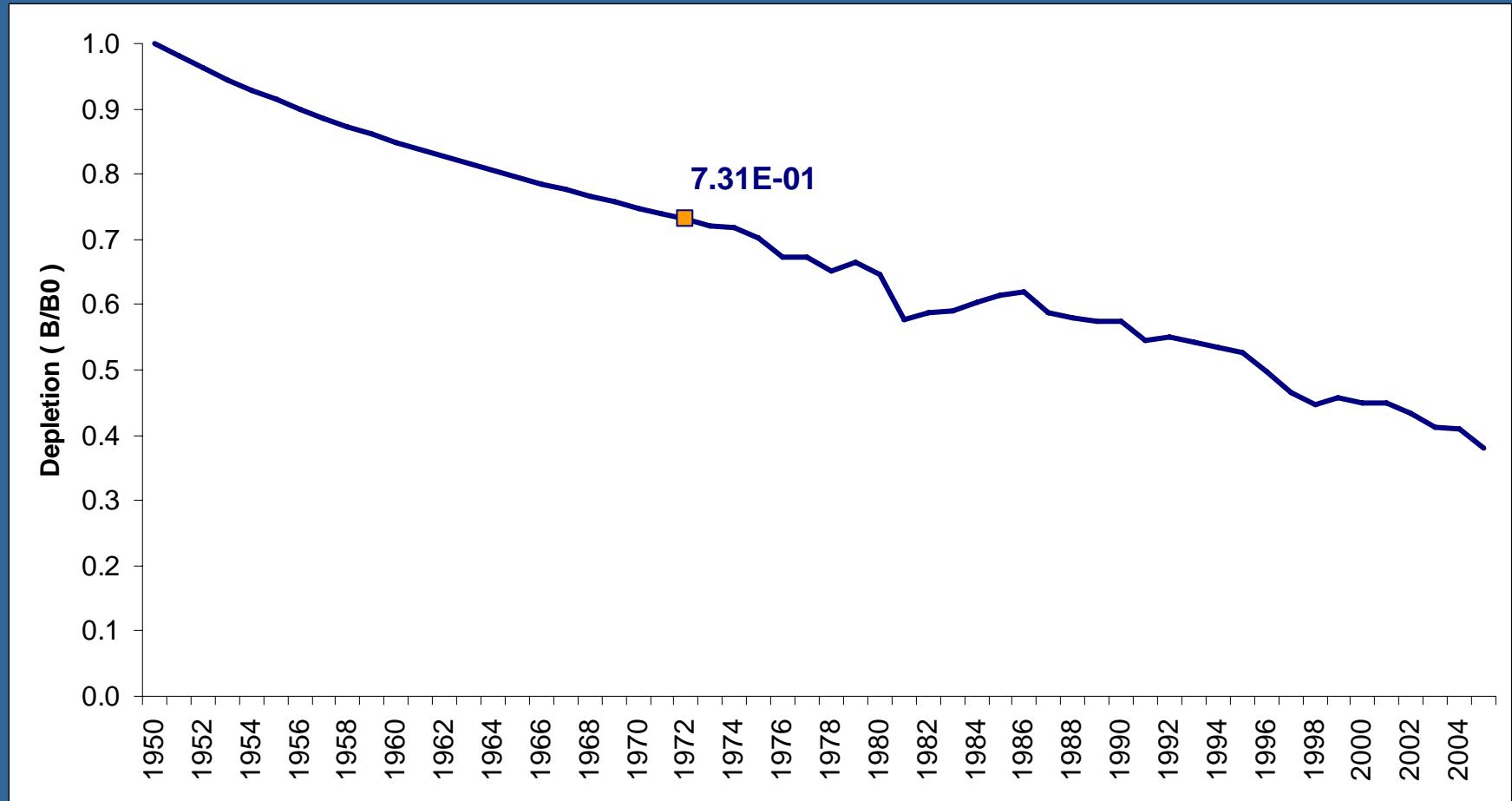
"obs" "pred"











4. Sensitivity Analyses

- S-1: inverse CV weighting of indices
- S-2: all indices used (forthcoming)

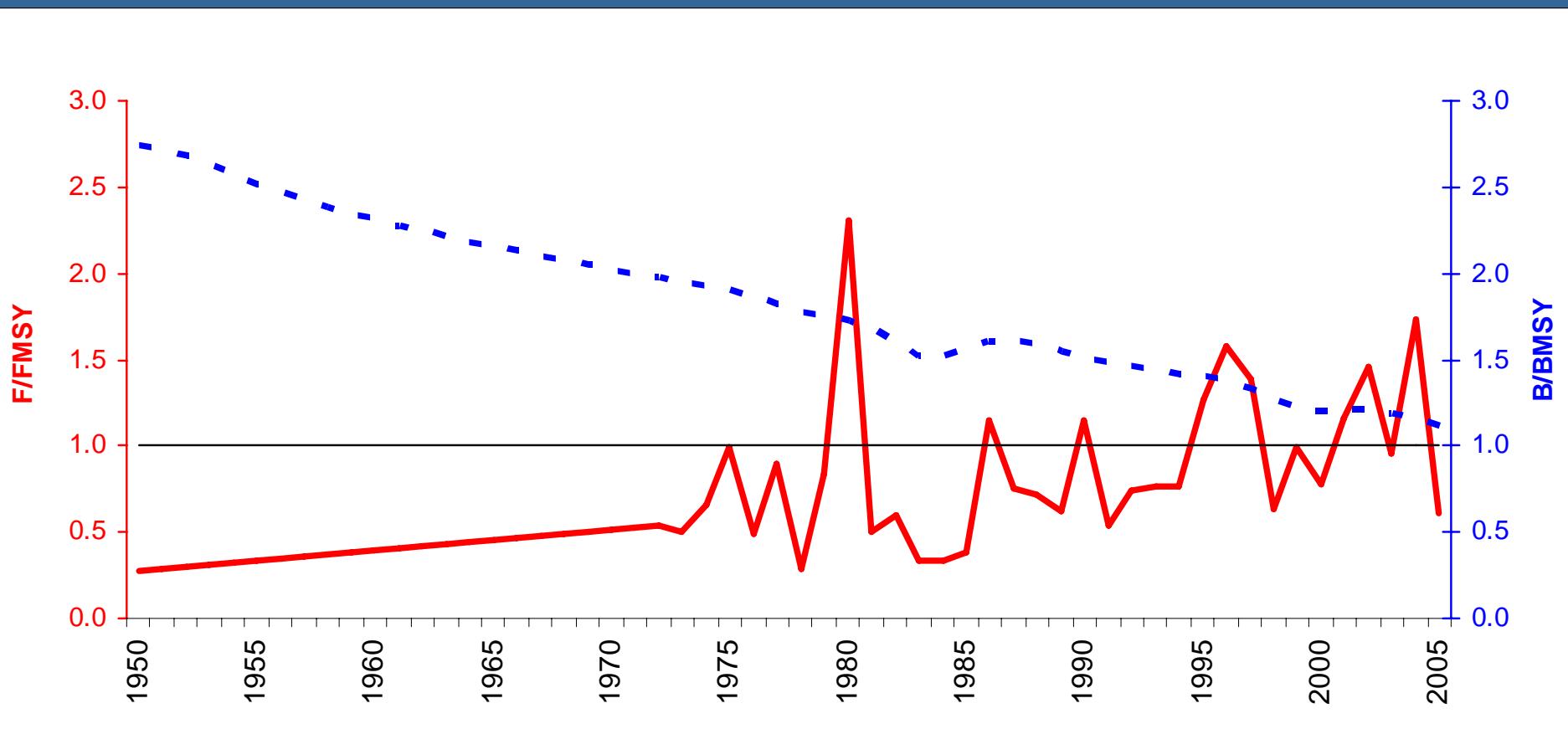
S-1 Results

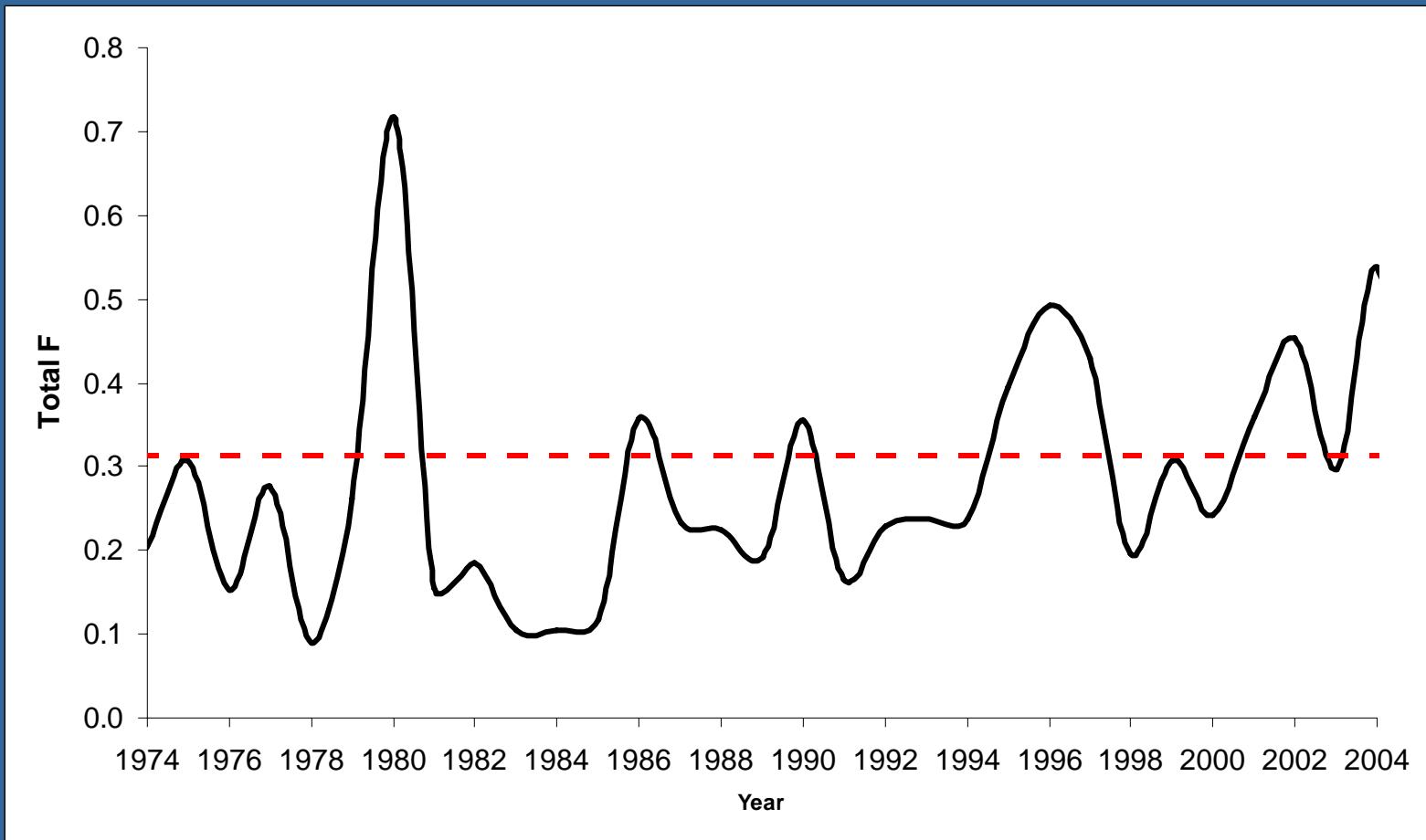
Parameter	BASE	S-1
$\text{SSF}_{2005}/\text{SSF}_{\text{MSY}}$	0.96 (0.51)	1.11 (0.45)
F_{2005}/F_{MSY}	0.73 (0.83)	0.61 (0.78)
N_{2005}/N_{MSY}	0.73	0.84
N_{MSY}	2.30E+06	2.46E+06
N_0	1.47E+06	1.56E+06
MSY	687,100	728,696
SPR_{MSY}	0.57 (0.21)	0.57 (0.23)
F_{MSY}	0.31	0.31

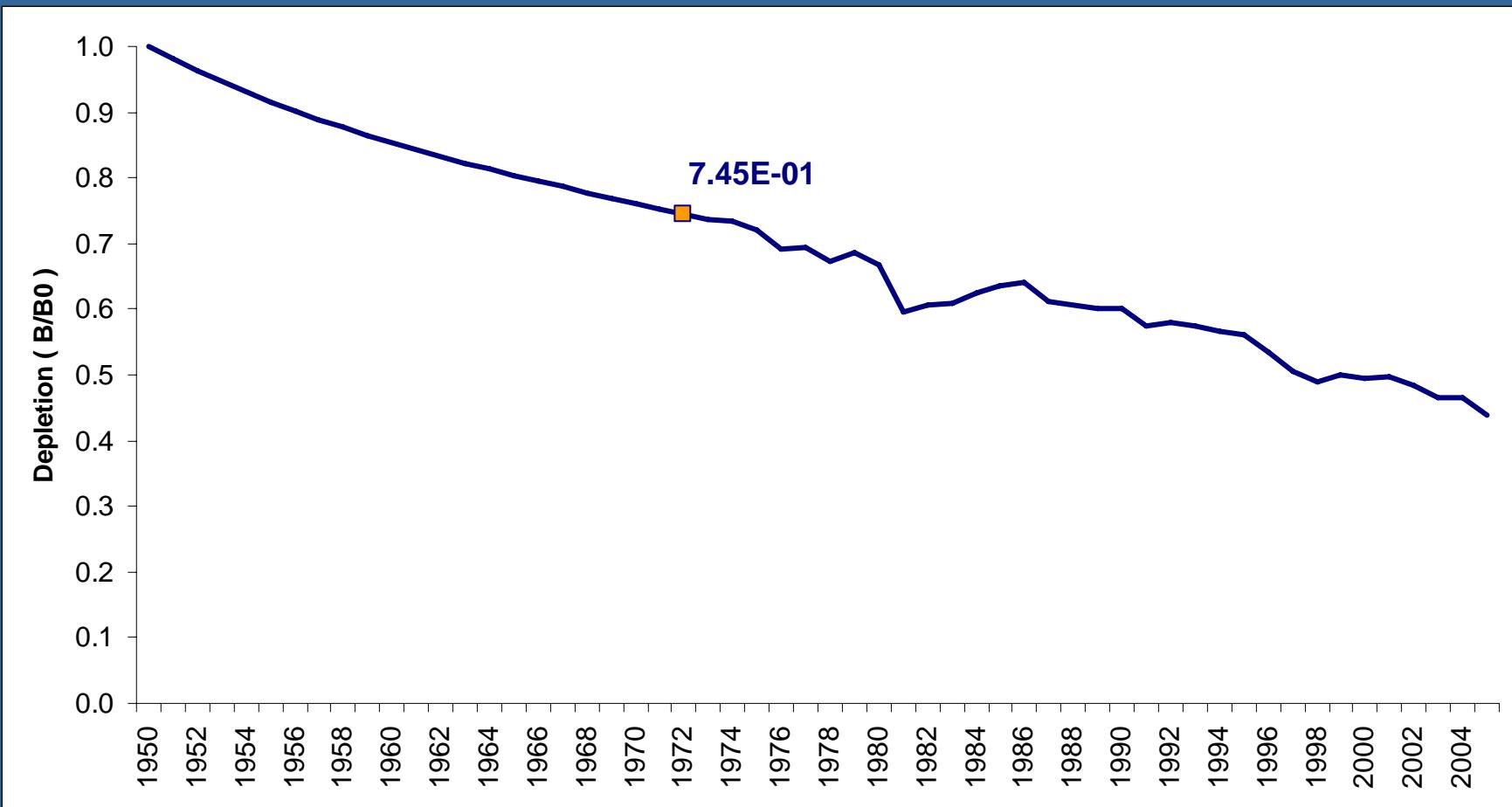
S-1 Results con't

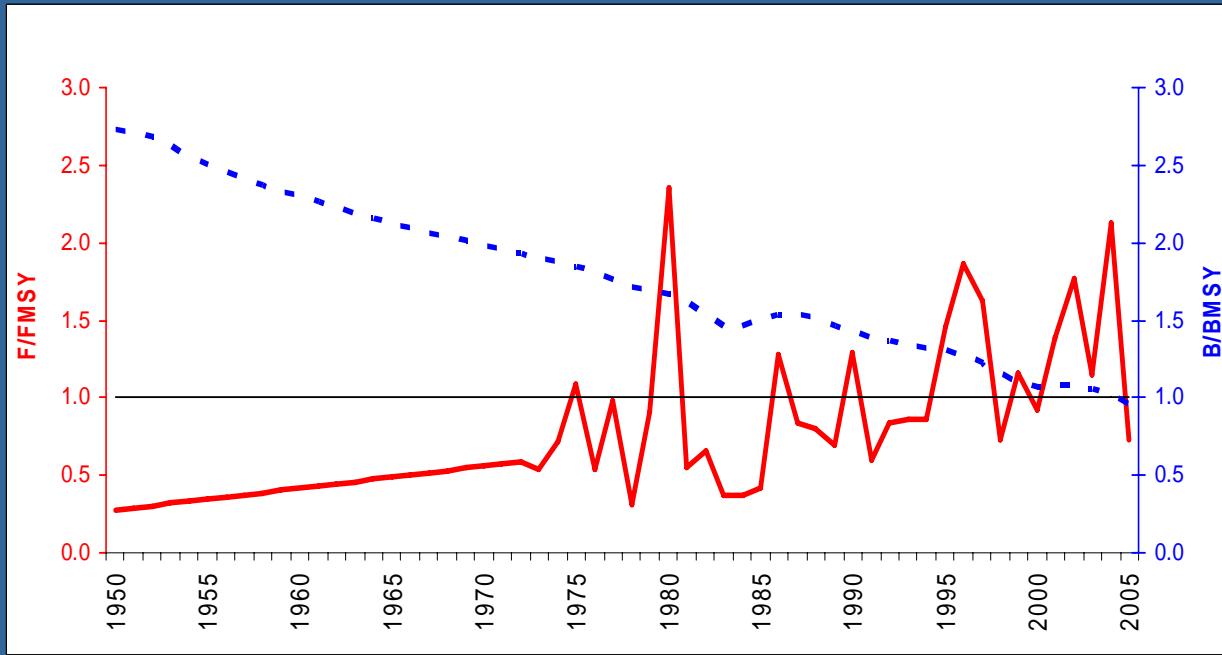
SSF_{MSY}	2.41E+06	2.55E+06
F_{2005}	0.23 (0.83)	0.19 (0.78)
SSF_{2005}	2.31E+06 (0.69)	2.84E+06 (0.65)
N_{2005}	1.69E+06	2.06E+06
$\text{SSF}_{2005}/\text{SSF}_0$	0.35 (0.50)	0.41 (0.32)
B_{2005}/B_0	0.35 (0.49)	0.40 (0.31)
R0	1.47E+06 (0.24)	1.56E+06 (0.35)
Pup-survival	0.71 (0.24)	0.70 (0.28)
alpha	3.12	3.15
steepness	0.438	0.441

Not overfished with no overfishing

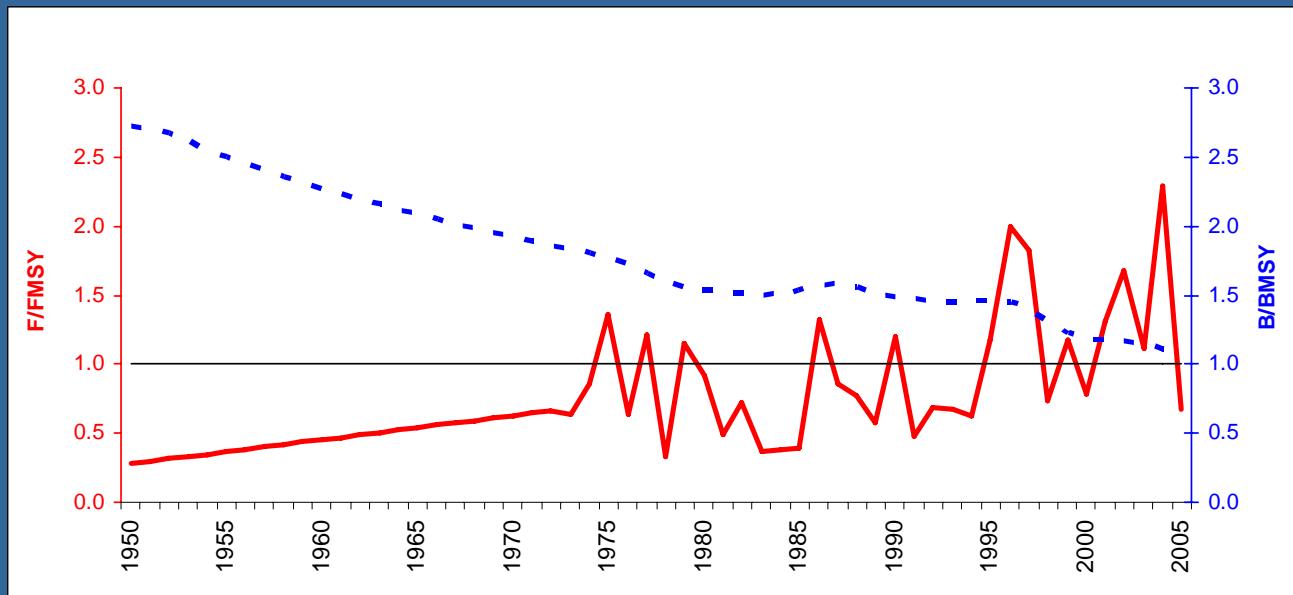


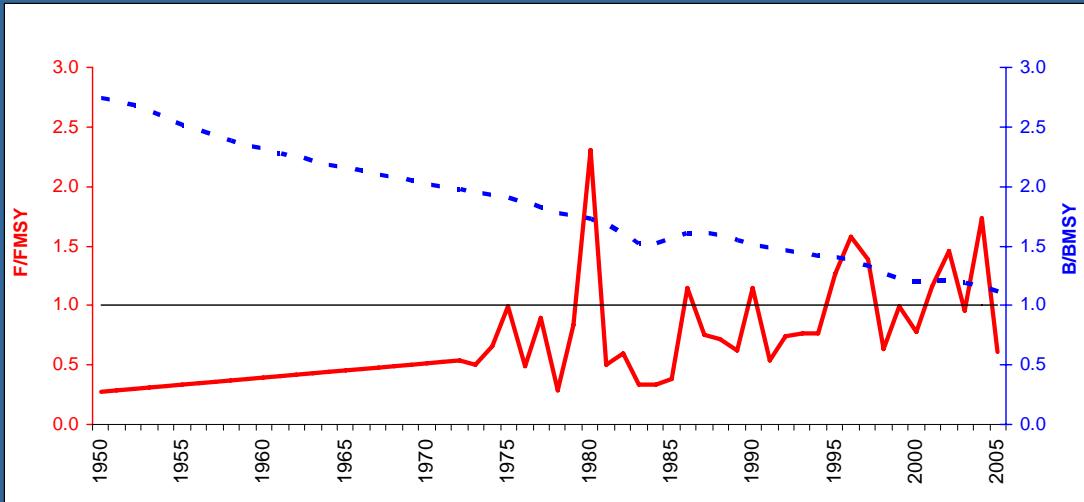




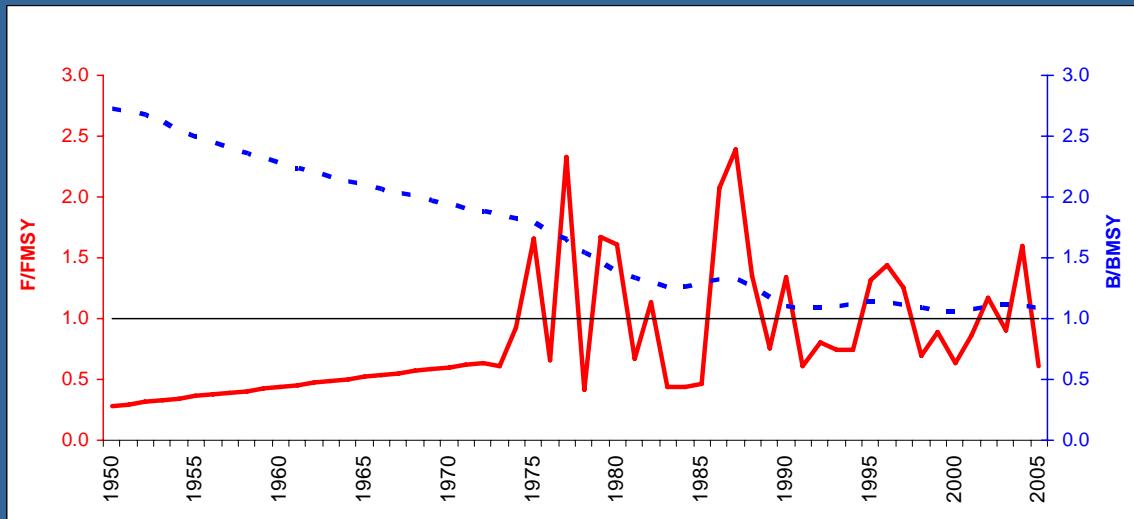


Updated
base

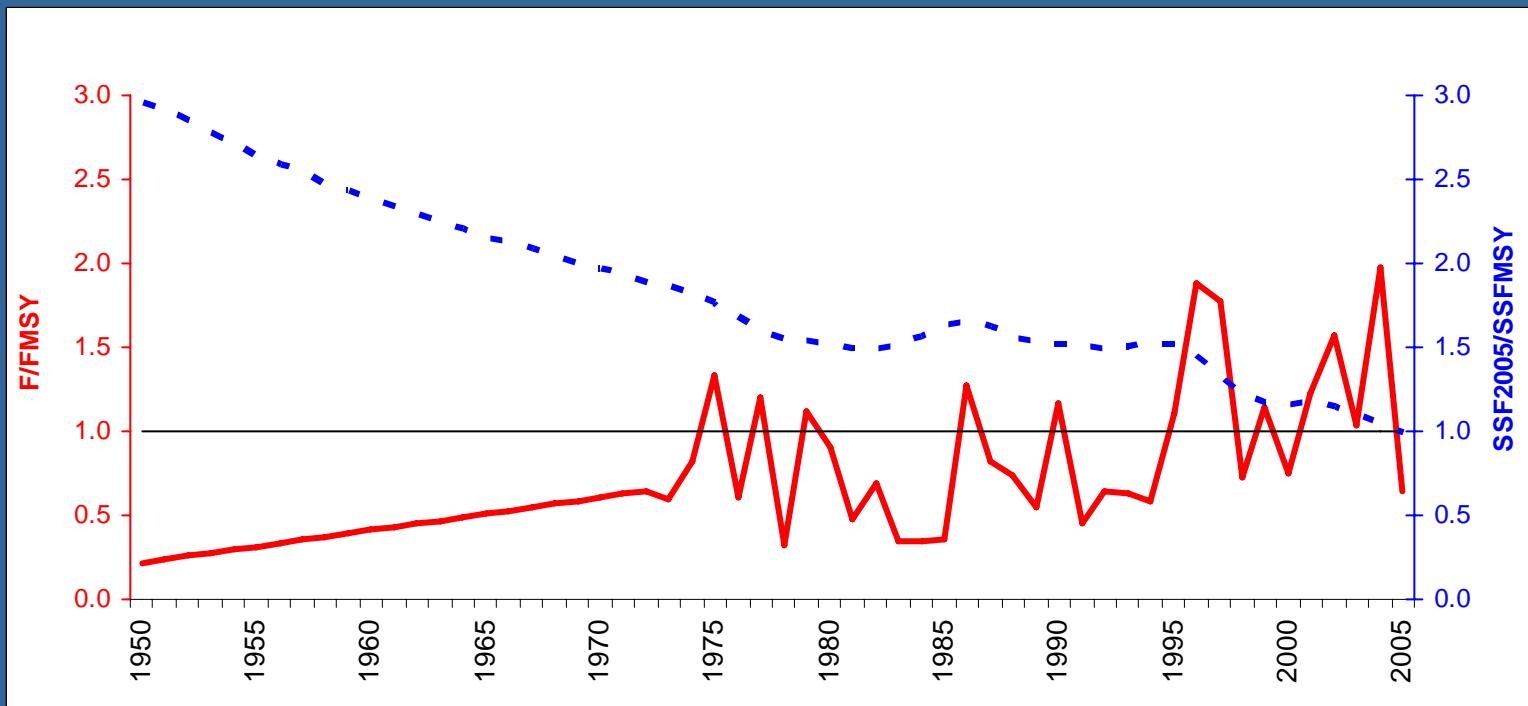




Updated
S-1



S-2



Bonnethead

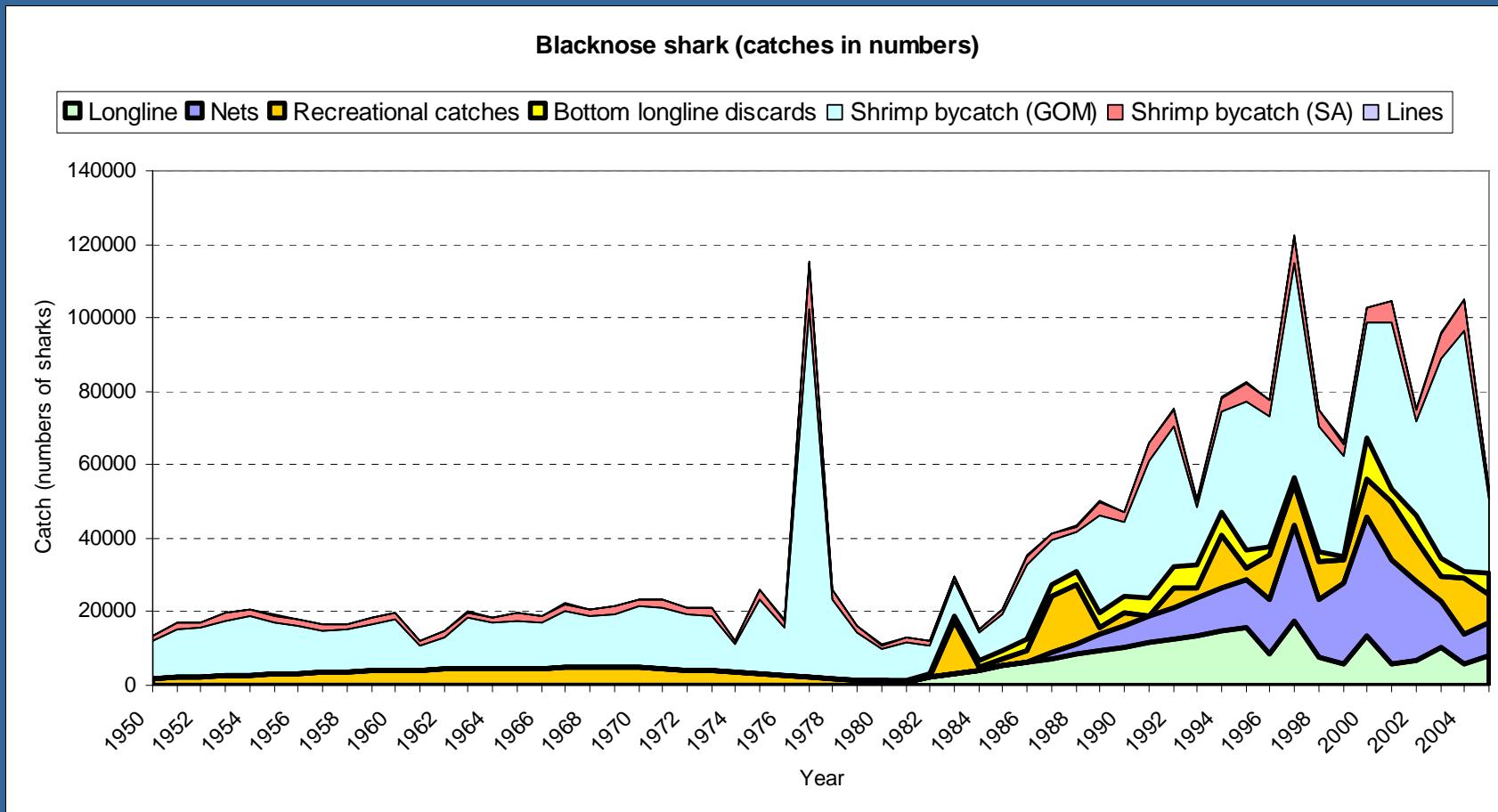
		BASE		S-1		S-2	
		Estimate	CV	Estimate	CV	Estimate	CV
$\text{SSF}_{2005}/\text{SS}_F_{\text{MSY}}$		1.05	0.44	1.08	0.45	0.99	0.39
F_{2005}/F_{MSY}		0.67	0.79	0.61	0.78	0.64	0.68
N_{2005}/N_{MSY}		0.77		0.83		0.85	
MSY		552399		538741		515356	
SPR_{MSY}		0.57	0.06	0.57	0.22	0.49	1.69
F_{MSY}		0.31		0.31	0.00	0.40	0.00
SSF_{MSY}		1951200		1899100		1991400	

N_{MSY}		1877191		1830779		1328847	
F_{2005}		0.21	0.79	0.19	0.78	0.19	0.68
SSF_{2005}		2045000	0.69	2056300	0.65	1965500	0.53
N_{2005}		1446948		1511463		1129173	
SSF_{2005}/SSF_0		0.39	0.42	0.40	0.32	0.33	0.38
B_{2005}/B_0		0.38	0.41	0.39	0.31	0.34	0.34
R0		1186100	0.30	1154000	0.35	980070	0.20
Pup-survival		0.70	0.24	0.70	0.28	0.70	0.24
alpha		3.11		3.13		4.20	
steepness		0.44		0.44		0.51	

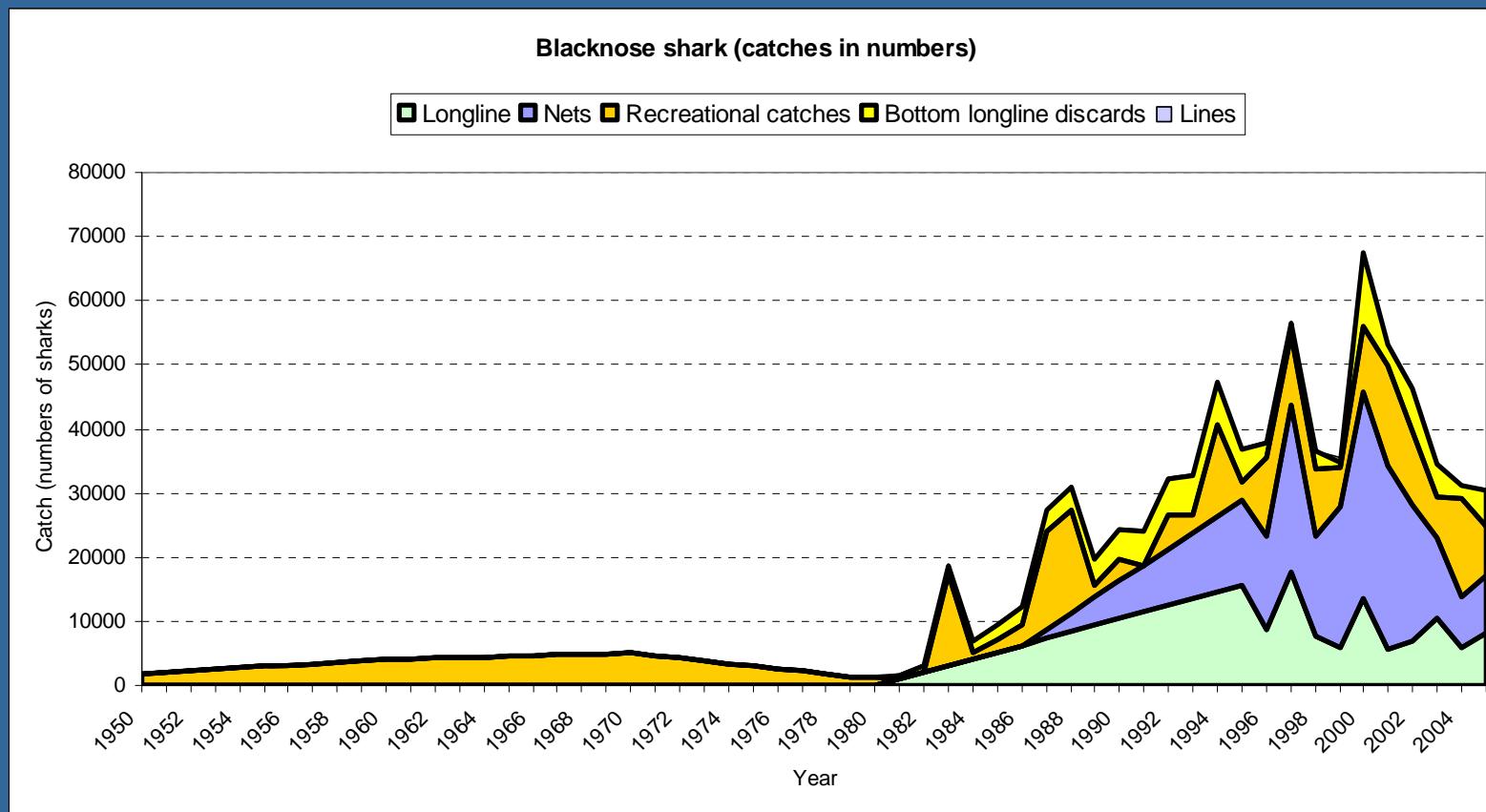
BN a. Fishery Inputs

- Catch Series:
 - Commercial
 - Longline
 - Gillnet
 - Handline
 - BLL-discards
 - Recreational
 - Shrimp Bycatch

Catches



Catches –shrimp bycatch



BN a. Indices

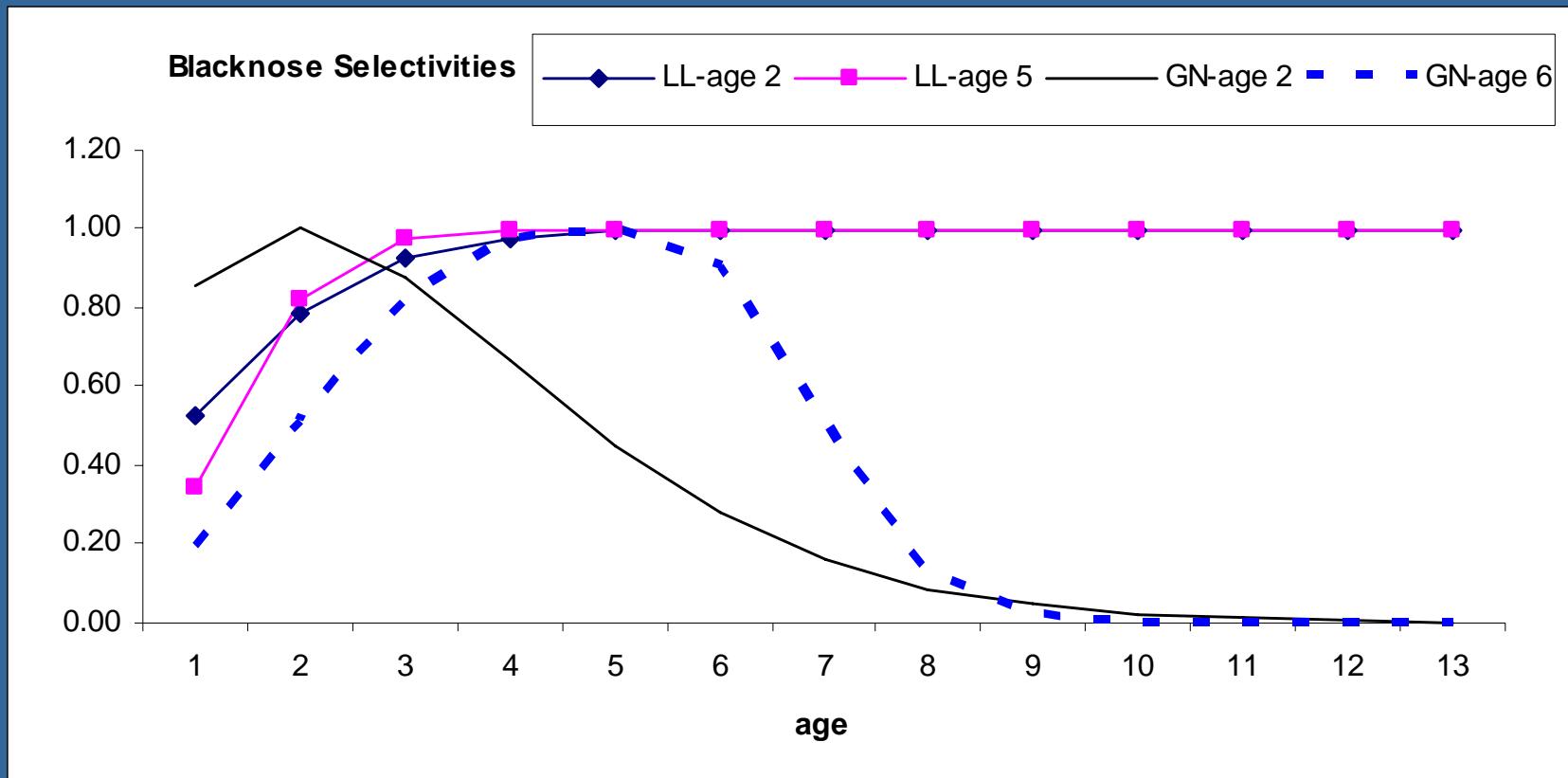
- Indices of Abundance:

- PC-Gillnet adult
- PC-Gillnet juvenile
- GNOP
- BLLOP
- NMFS LL SE
- SCDNR
- UNC
- MML

1b. Biological Inputs – DW values

Parameter	Bonnethead	Blacknose	Sharpnose
L_∞	113.9 (cm TL)	80.2 (cm FL)	80.2 (cm FL)
K	0.22	0.3	0.61
t0	-1.25	-1.71	-0.84
a	9.52E-11	8.0E-06	5.55519E-6
b	3.59	3.0494	3.07395
Pup Survival	0.66	0.72	0.70
Virgin Recruitment (R0)	[1.0E+4, 1.0E+10]	[1.0E+4, 1.0E+10]	[1.0E+3, 1.0E+10]

Blacknose Selectivities



2. Model Description

- Historical period 1950-1971
- Estimated catch series begin in 1972 (Shrimp bycatch) and 1981 (Recreational); earliest index (UNC) begins in 1972
- Catches from 1950-1972 were estimated

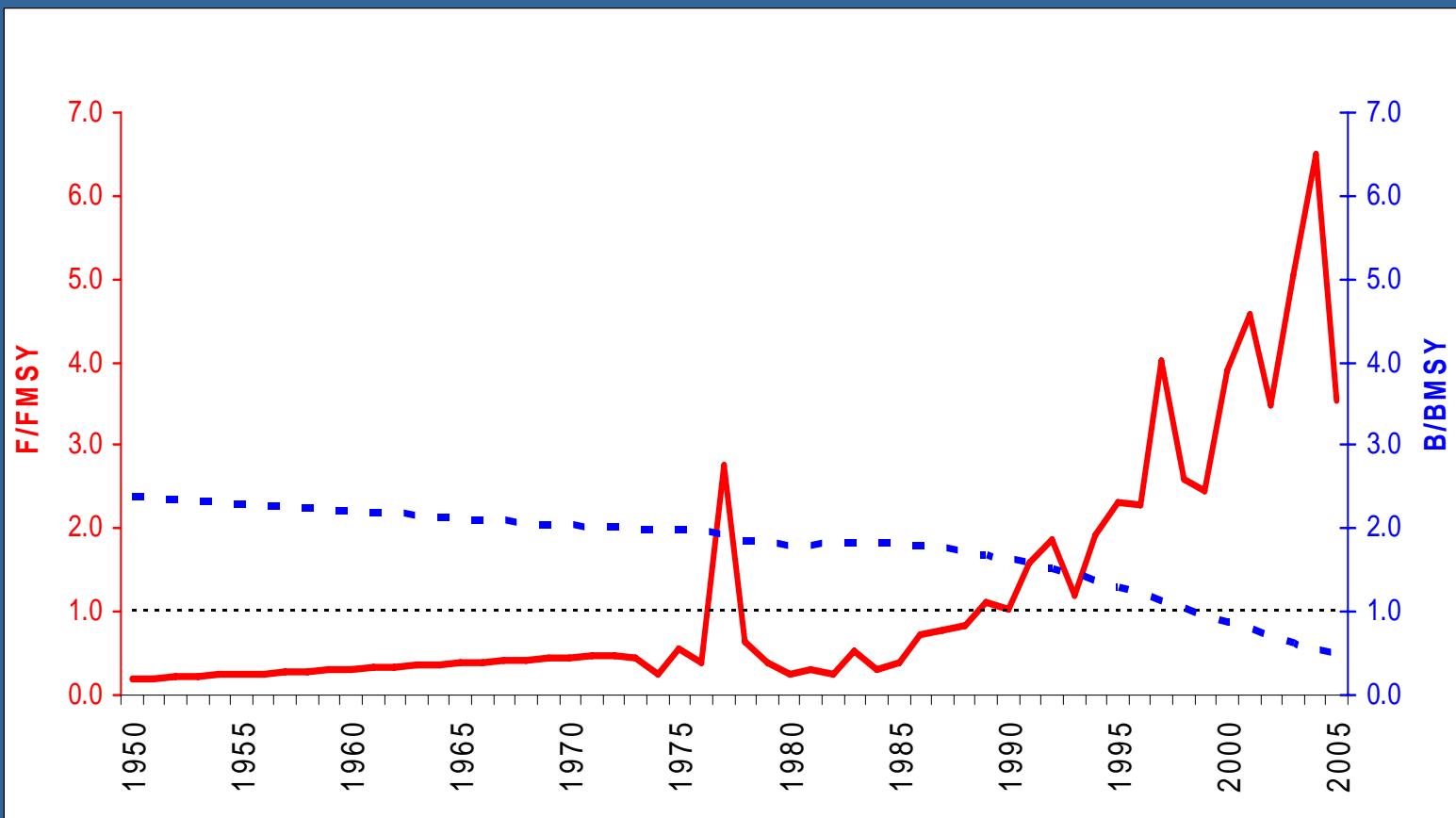
3. Base Model and Results

Parameter	BASE
$\text{SSF}_{2005}/\text{SSF}_{\text{MSY}}$	0.47 (0.62)
F_{2005}/F_{MSY}	3.53 (0.83)
N_{2005}/N_{MSY}	0.47
N_{MSY}	5.90E+05
N_0	1.33E+06
MSY	103,756
SPR_{MSY}	0.71 (0.39)
F_{MSY}	0.07

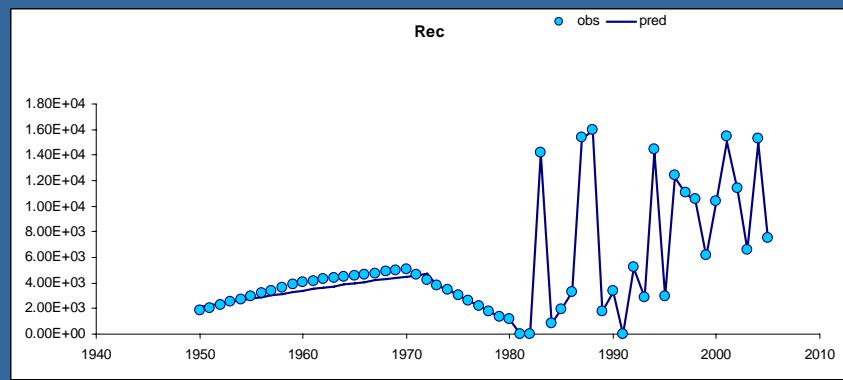
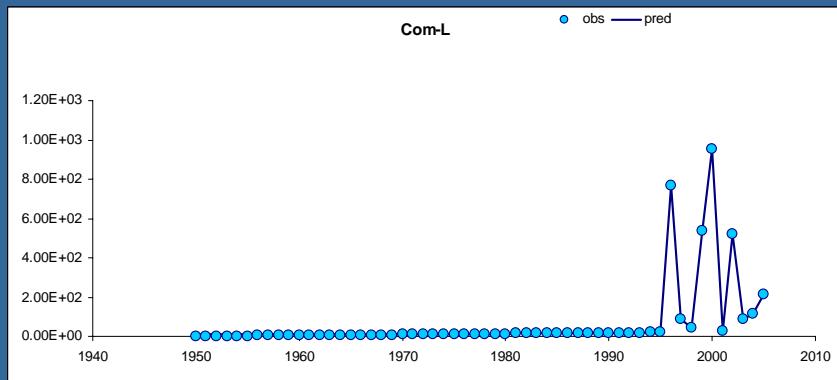
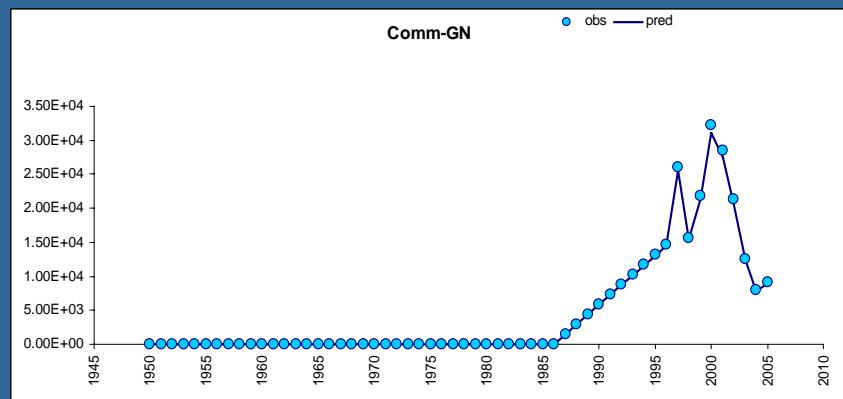
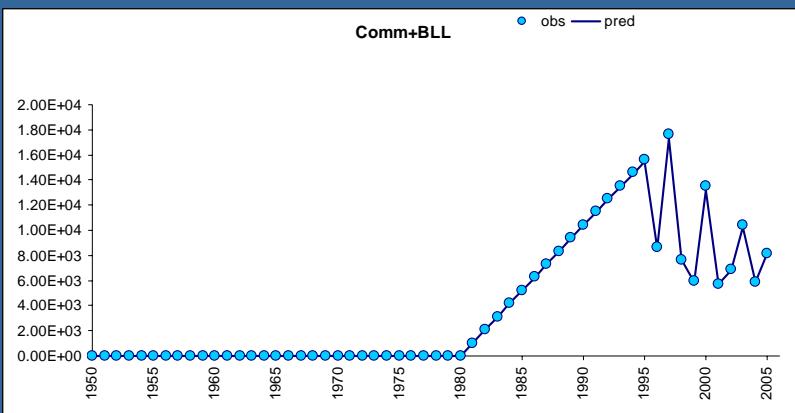
Models results con't.

SSF_{MSY}	3.60E+05
F_{2005}	0.24 (0.78)
SSF_{2005}	1.69E+05 (0.78)
N_{2005}	2.78E+05
SSF_{2005}/SSF_0	0.20 (0.32)
B_{2005}/B_0	0.17 (0.69)
R_0	3.30E+05 (0.18)
Pup-survival	0.785
alpha	2.035
steepness	0.337

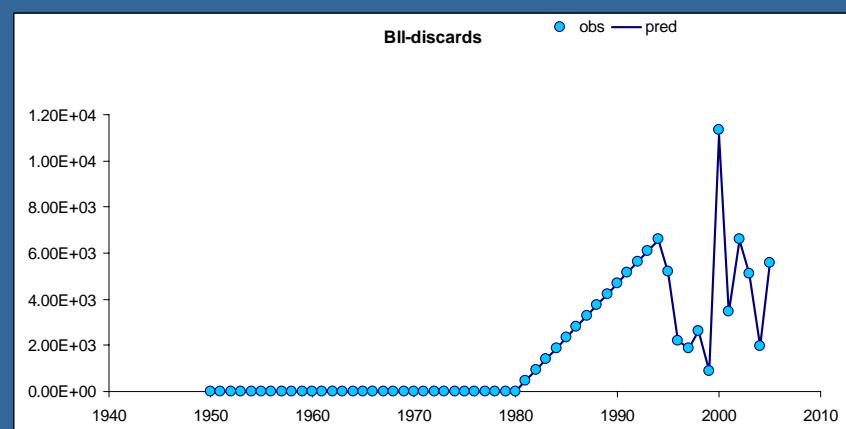
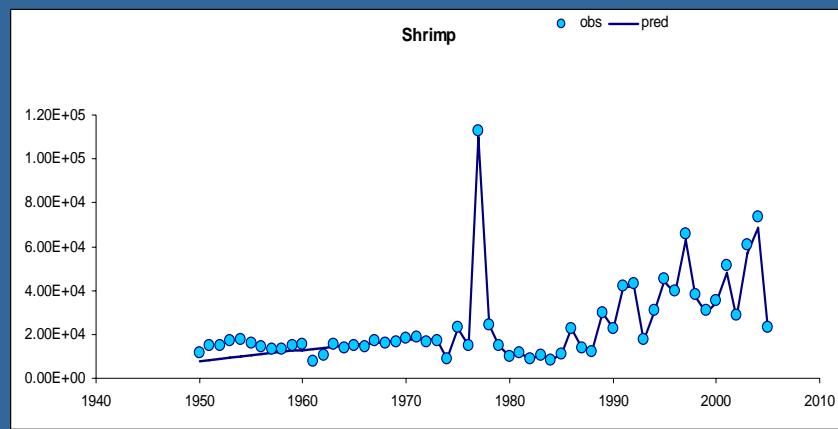
Overfished with overfishing



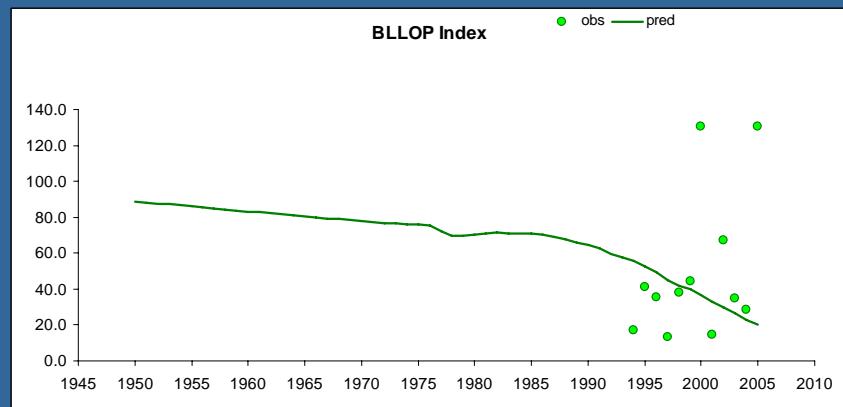
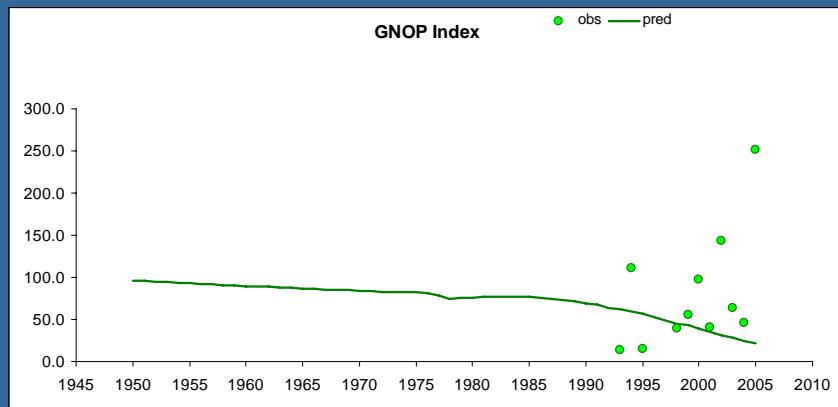
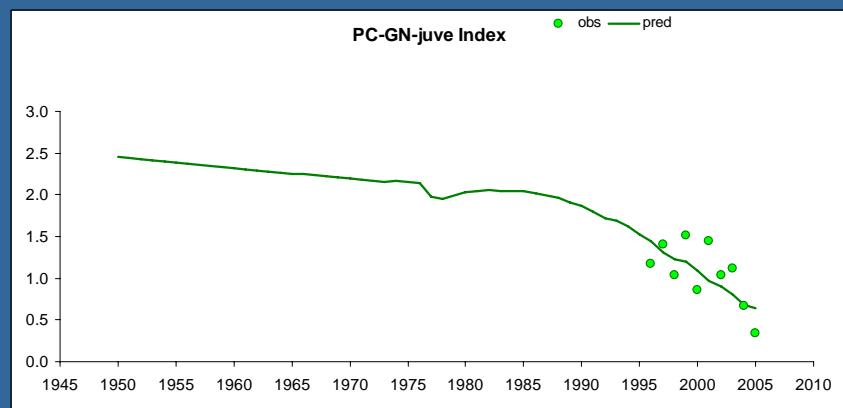
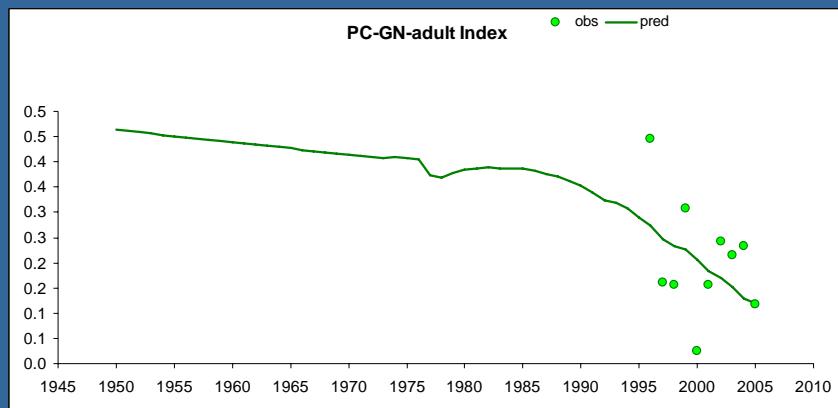
Catches



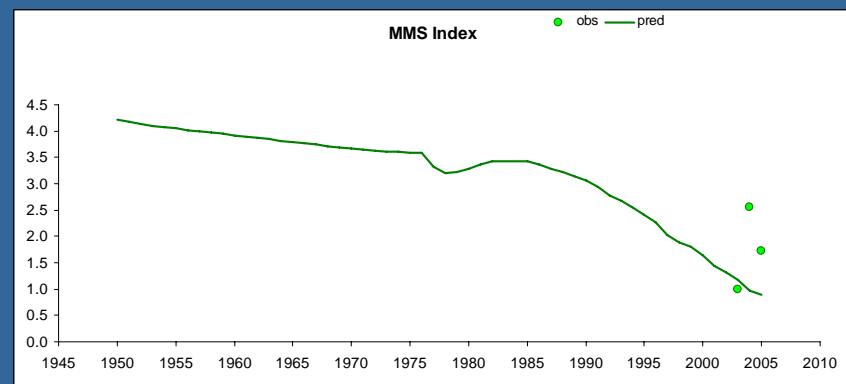
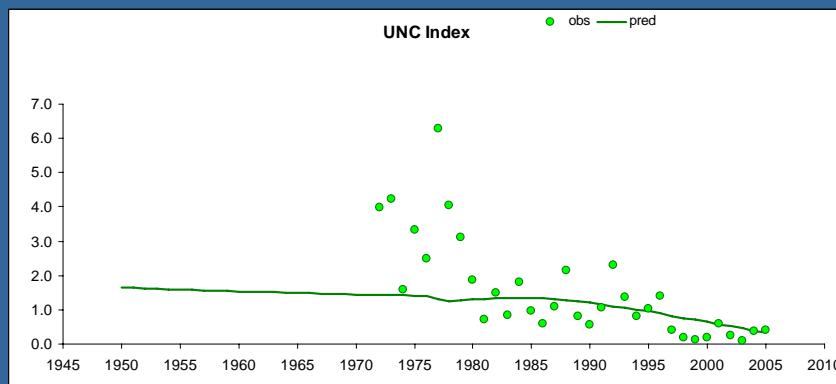
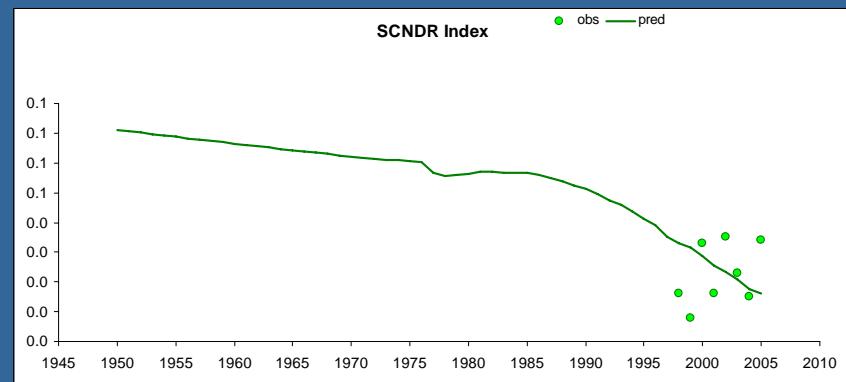
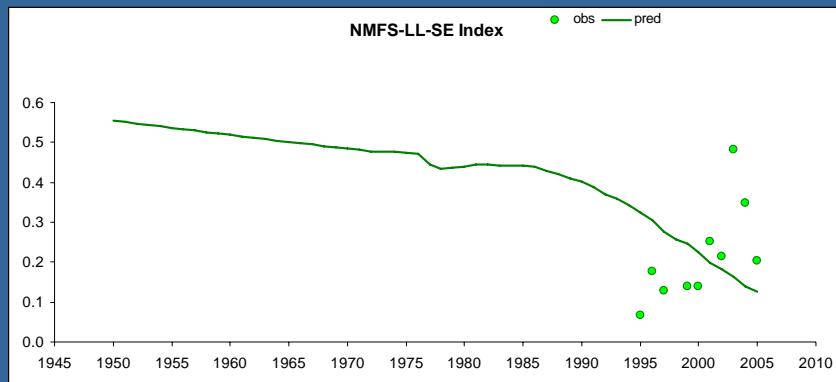
Catches con't.

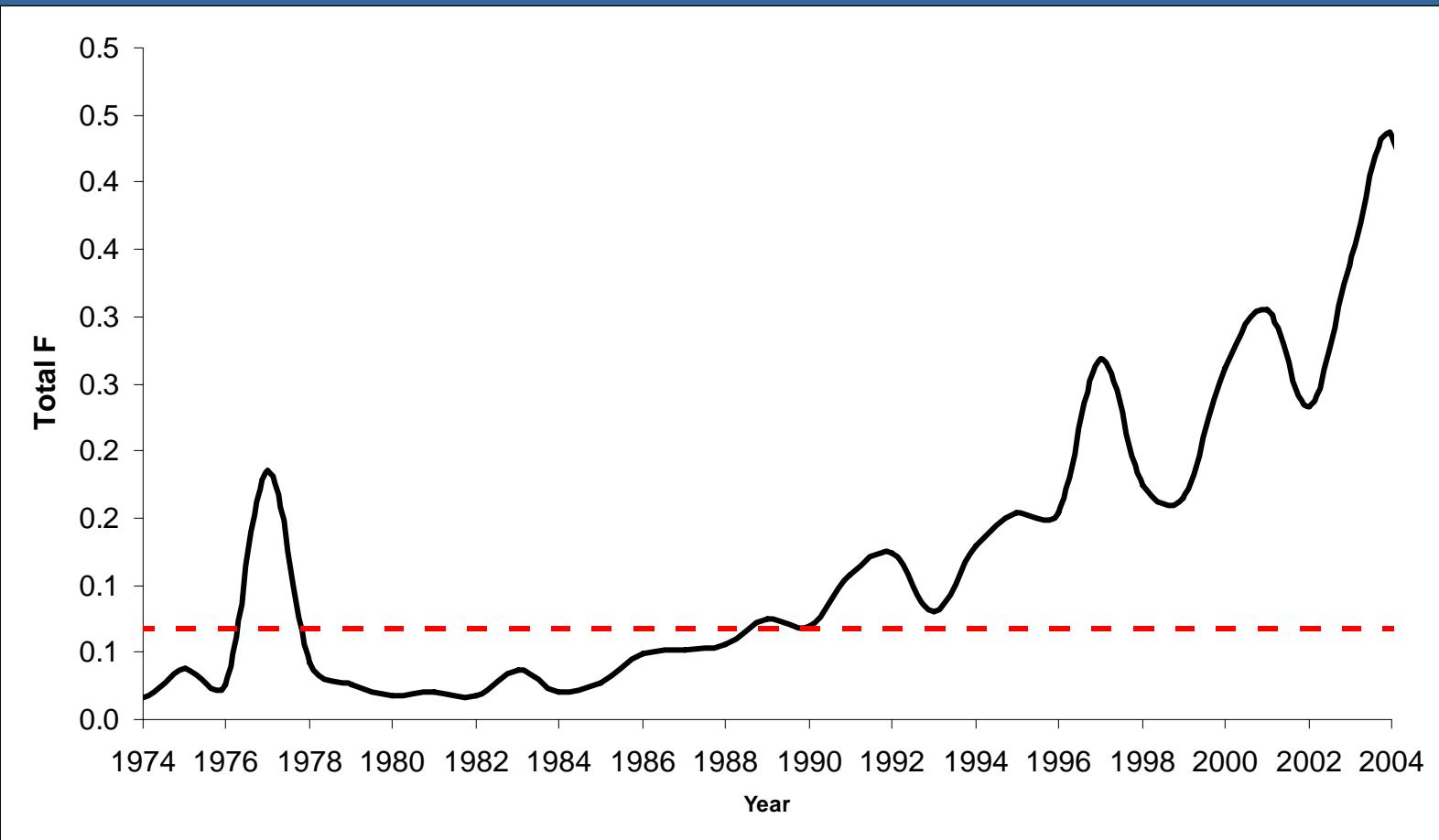


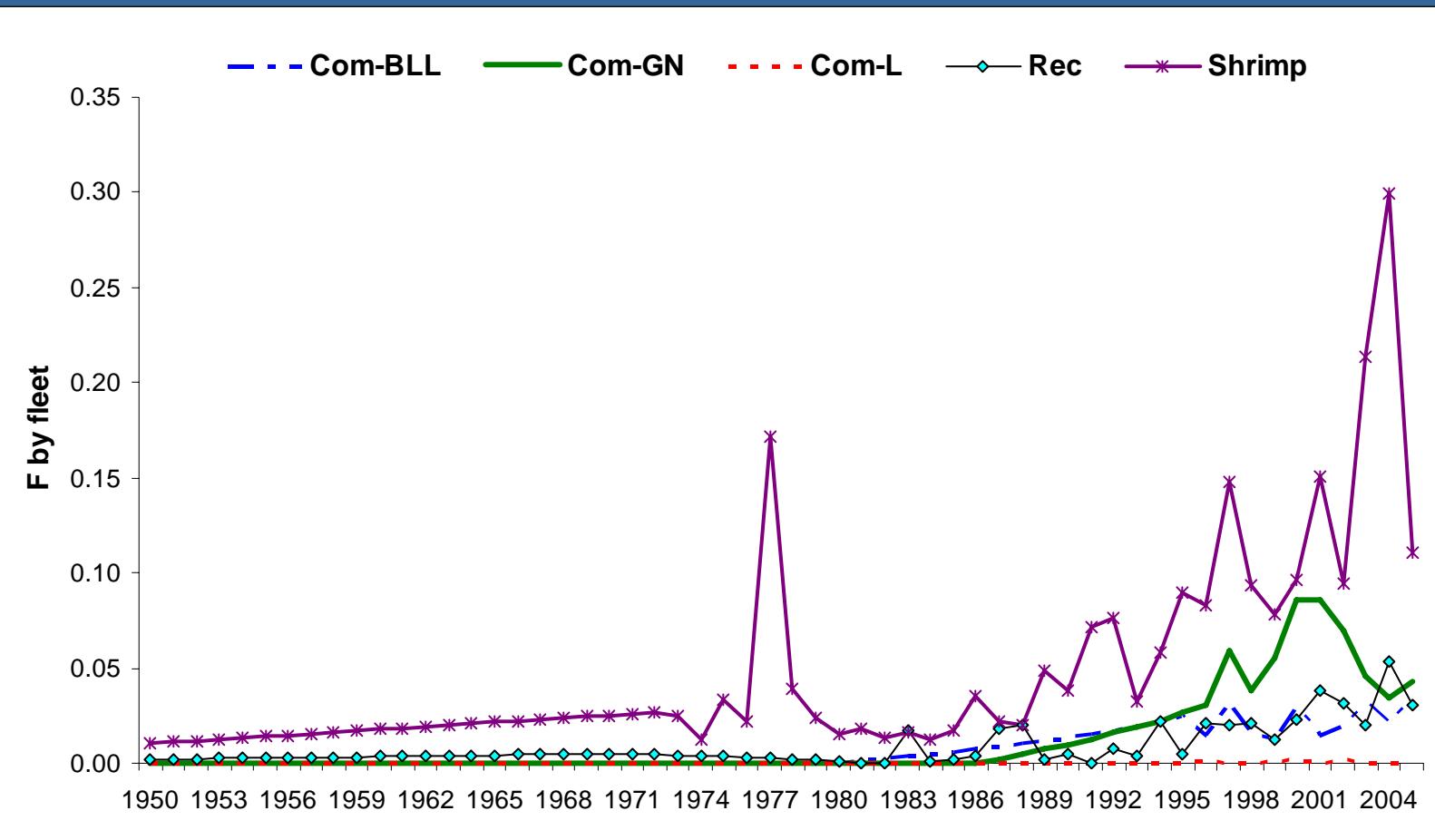
Indices

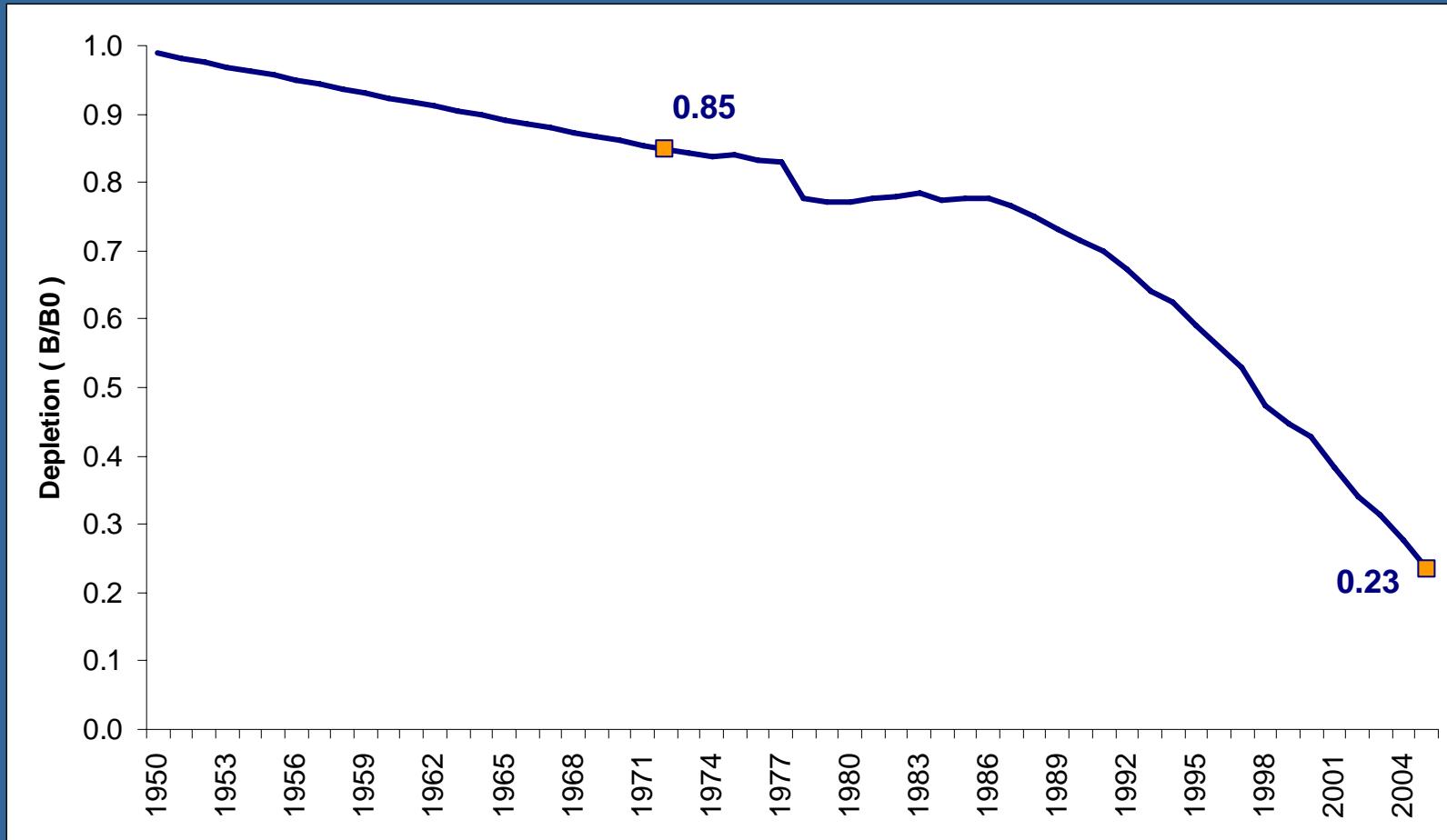


Indices con't.



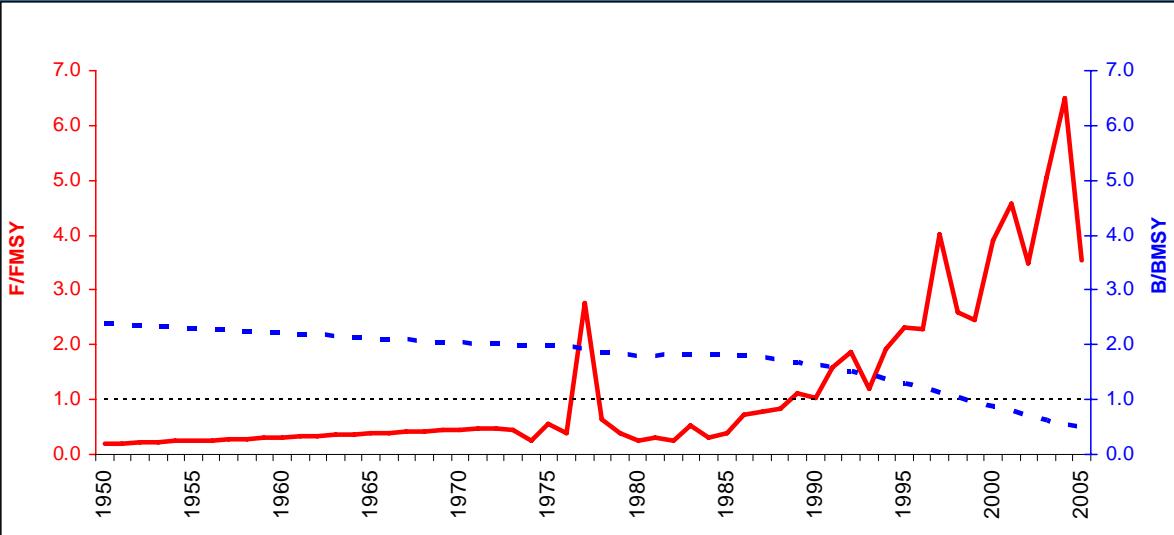




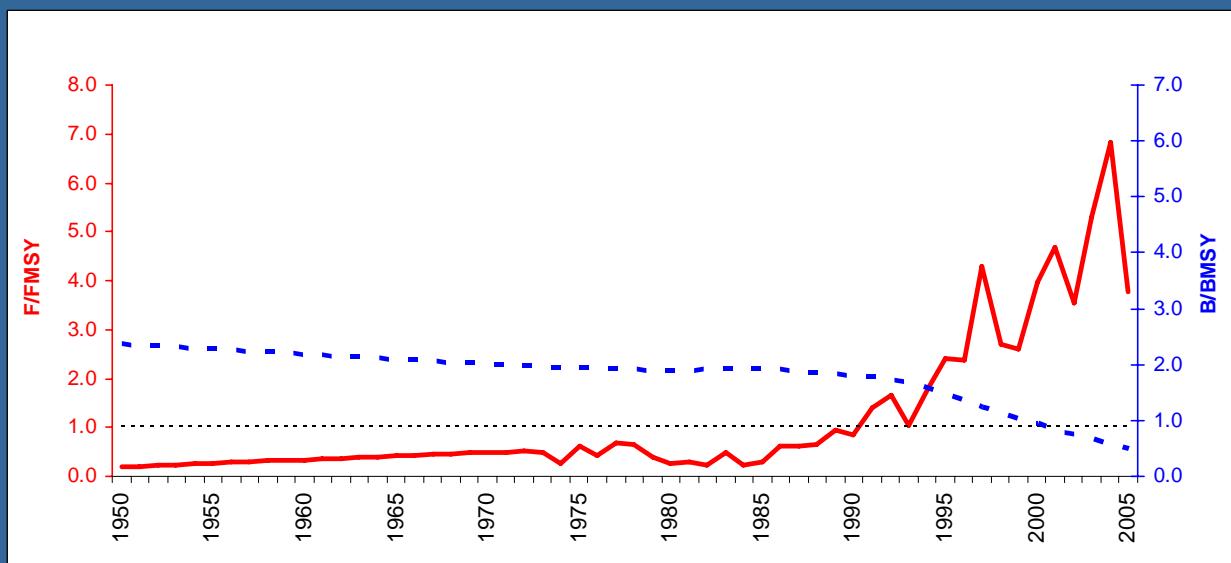


Sensitivities

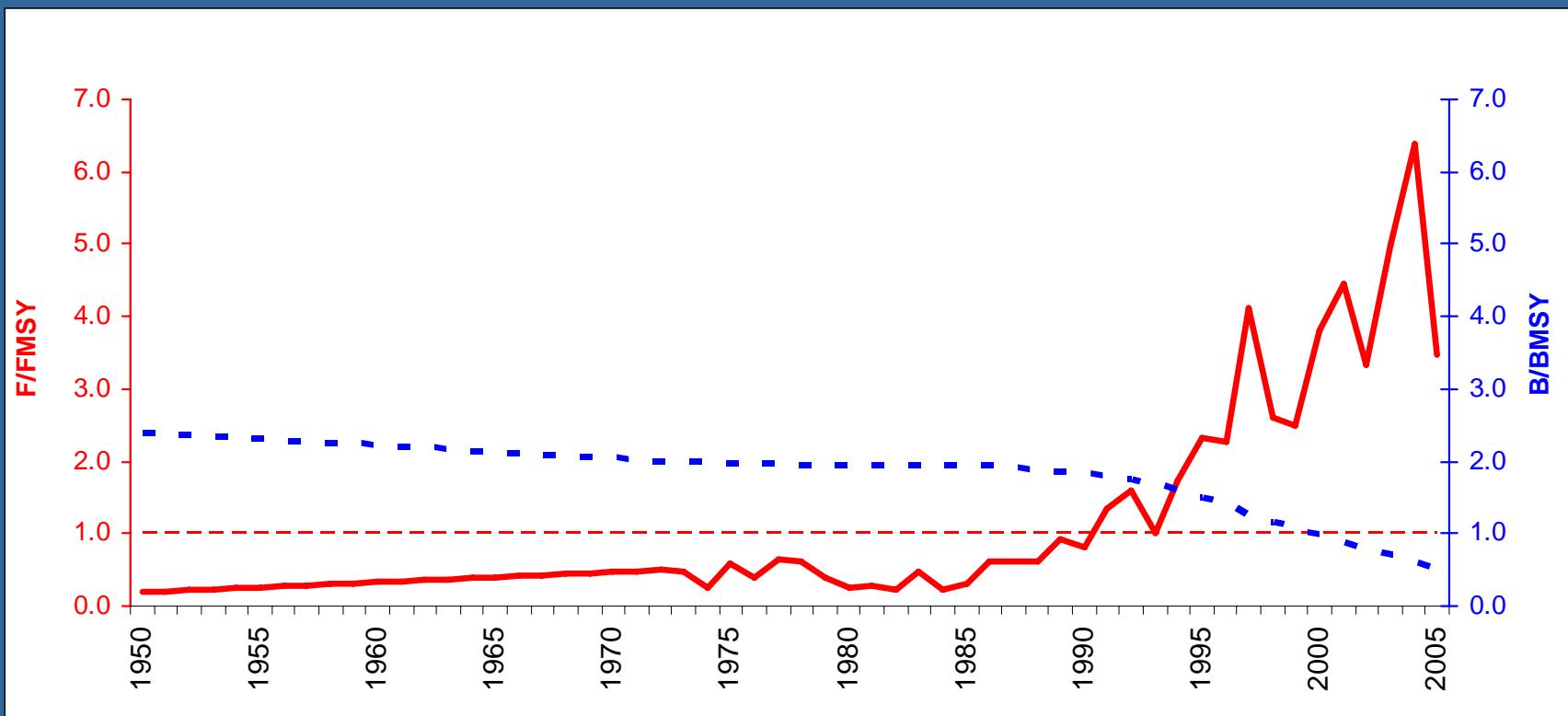
- S-1: Inverse CV weighting
- S-2: Include all indices (2 sensitivity indices) forthcoming



Updated
base



S-1



Blacknose

		BASE		S-1		S-2	
		estimate	cv	Estimate	CV	Estimate	CV
$\text{SSF}_{2005}/\text{SSF}_{\text{MSY}}$		0.48	0.67	0.52	0.59	0.60	0.62
F_{2005}/F_{MSY}		3.77	0.83	3.48	0.81	3.49	0.76
N_{2005}/N_{MSY}		0.48		0.52		0.50	
MSY		89415.00		99876.00		99673.00	
SPR_{MSY}		0.71	0.38	0.71	0.39	0.70	0.04
F_{MSY}		0.07	0.00	0.07	0.00	0.07	0.00
SSF_{MSY}		349060.00		347930.00		343050.00	
N_{MSY}		570753.15		569594.63		569553.16	
F_{2005}		0.24	0.83	0.23	0.16	0.23	0.76
SSF_{2005}		168140.00	0.75	179870.00	0.77	204720.00	0.71
N_{2005}		349308.40		293540.47		286486.74	
$\text{SSF}_{2005}/\text{SSF}_0$		0.20	0.65	0.22	0.00	0.21	0.55
B_{2005}/B_0		0.17	0.68	0.19	0.66	0.18	0.55
R0		317590.00	0.19	321470.00	0.19	315000.00	0.18
Pup-survival		0.78	0.23	0.78	0.23	0.79	0.23
alpha		2.02		2.02		2.05	
steepness		0.34		0.34		0.34	